



IndianOil

PHBPL, PARADIP

ON-SITE

EMERGENCY

PLAN

**Paradip-Haldia-Barauni Pipeline, Paradip
Village: Dinkia, Abhayachandrapur
Tehasil: Kujang, P.S.129.,Dist: Jagatsinghpur
PIN: 754142**

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CHAPTER-1

GENERAL INFORMATION

1.1 Introduction

Paradip–Haldia section of Paradip Haldia Barauni Pipeline (PHBPL) was constructed with the prime objective to meet crude oil requirement of Haldia and Barauni Refineries. Prior to PHCPL, the total crude oil requirement of Haldia and Barauni refineries was received through Haldia Dock Complex. Due to insufficient draft in the 120 Km long navigational channel, crude oil was brought through smaller parcels resulting high transportation cost of crude. So to reduce high cost on transportation and increase refinery margin, Board of Directors of Indian Oil Corporation Limited approved laying of crude oil pipeline from Haldia to Paradip on 30th March,2004 for a capacity of 11 MMTPA vide letter No Secl/1004/490 dated 20th April,2004. Subsequent to commissioning of Paradip-Haldia section on 17th January, 2009 Haldia-Barauni Crude Pipeline (HBCPL) has been renamed as Paradip-Haldia-Barauni Pipeline (PHBPL). Present capacity of the Paradip- Haldia section is 15.2 MMTPA.

1.1.1 Location of IOCL Paradip crude oil Terminal

Paradip is the mother station of PHBPL. Paradip crude oil terminal is situated in the eastern part of Orissa at Abhaychandrapur & Dinkia, P.S. Kujanga in Jagatsinghpur District. The Terminal is situated on the south-east end of Paradip within the Paradip Refinery premises & is approximately 95 KM distance from Cuttack. Paradip oil terminal is located at longitude 86036'28"E and latitude 20040'17"N. The nearest Paradip port is one of the major ports of India and is located at latitude 20015'55.44"N and longitude 86040'34.62"E (210 nautical miles south of Kolkata and 260 nautical mile north of Visakhapatnam).

Integrated Offshore Crude Handling Facilities at Paradip

Integrated Offshore Crude Oil Handling Facilities comprises of three Single Point Mooring Systems (SPM) and subsea pipelines of 48 inch diameter from SPMs to onshore tank farm, including two loop lines interconnecting SPM-I to SPM-II & SPM-II to SPM-III for offloading crude oil. The crude oil is offloaded from VLCC tanker up to 3,20,000 DWT moored to either SPM-I or SPM-II or SPM-III system (CALM type) or simultaneous unloading from more than one SPM and transported through subsea pipelines.

Surroundings of Location

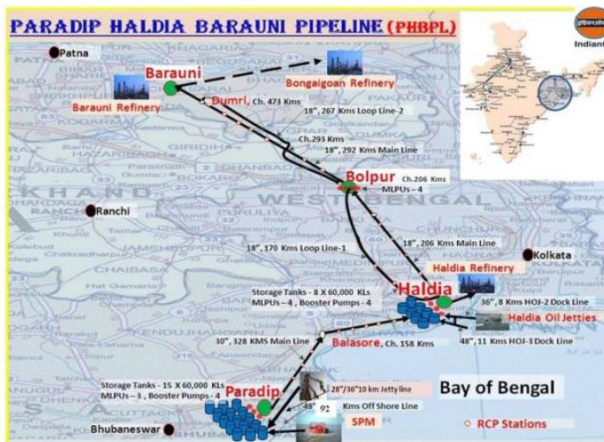
Direction	Description of Surrounding
North Paradip Refinery	South Beach of Bay of Bengal
East Green Belt of Paradip Refinery	West Green Belt of Paradip Refinery

Name & Address of the factory	Paradip-Haldia-Barauni Pipeline, Paradip Village: Dhinkia, Abhayachandrapur Tehasil: Kujang, P.S.129, Dist: Jagatsinghpur, 754142
Name of the Occupier	Shri K Navin Sankaran, DGM (O)
Name of the Manager	Shri Angshuman Roy, CMNM
Products handled	Crude Oil
Source of products	By tankers/ vessels
Storage	Crude Oil Storage Tanks (20 Nos.)
Transportation	Through pipeline

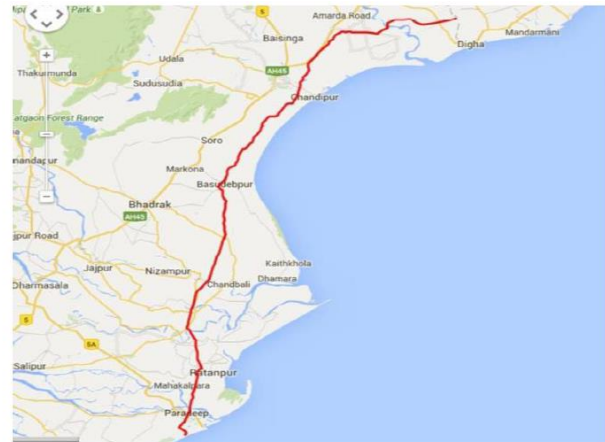
1.1.2 Industrial Activity

Brief about Plant and Process

Paradip is the mother station of Paradip Haldia Barauni Pipeline which supplies the crude oil to Paradip, Haldia, Barauni & Bongaigaon refineries of Eastern India. Paradip crude oil terminal is situated at Abhaychandrapur & Dhinkia, P.S. Kujanga in Jagatsinghpur District.



Paradip Haldia Barauni Pipeline (PHBPL)



Route of PHBPL in Odisha

The following facilities are provided at PHBPL, Paradip:

1. Three SPMs & offshore pipelines
2. Storage tanks 20 Nos. of capacity 60000 KL each.
3. Mainline pumping & booster pumping units

Process of transportation of crude oil:

The crude oil which is brought by tankers is unloaded through the Single Point Mooring Systems installed in the Bay of Bengal and received in shore tanks located at Paradip through the offshore and onshore pipeline connecting the SPMs and the tank farm. The originating pump station of PHBPL is situated at Paradip. From Paradip crude oil is pumped to Haldia, having crude storage tanks, which also act as intermediate pumping station. Crude oil is pumped from Haldia to Barauni and Bongaigaon Refinery.

The complete arrangement of movement of crude oil from offshore system at Paradip to Haldia is broadly categorized in three groups

1. Receipt of crude oil at Paradip
2. Storage of crude oil at Paradip
3. Pumping of crude oil from Paradip to Haldia

1. Receipt of crude oil at Paradip –

Crude oil at Paradip station is received through Crude Oil tankers connected to Single Point Mooring (SPM) System.

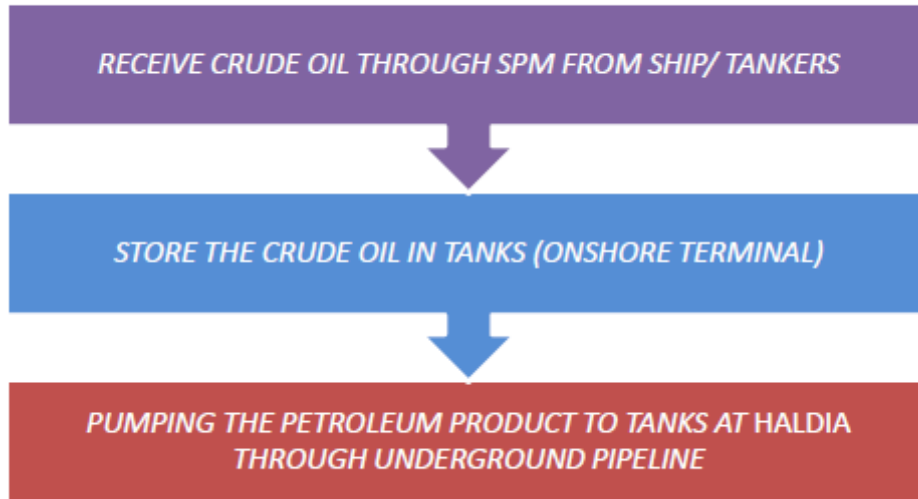
2. Storage of crude oil at Paradip

The crude oil received from tanker through SPMs (or through jetty line) is stored in tank farm at Paradip. The tank farm at Paradip comprises 20 Crude oil storage tanks of Nominal Capacity 60,000 KL each, designated as PT-01, PT – 02, PT-03...up to PT-20. The tanks are Floating Roof, Double deck constructed in accordance with API-650 Standard.

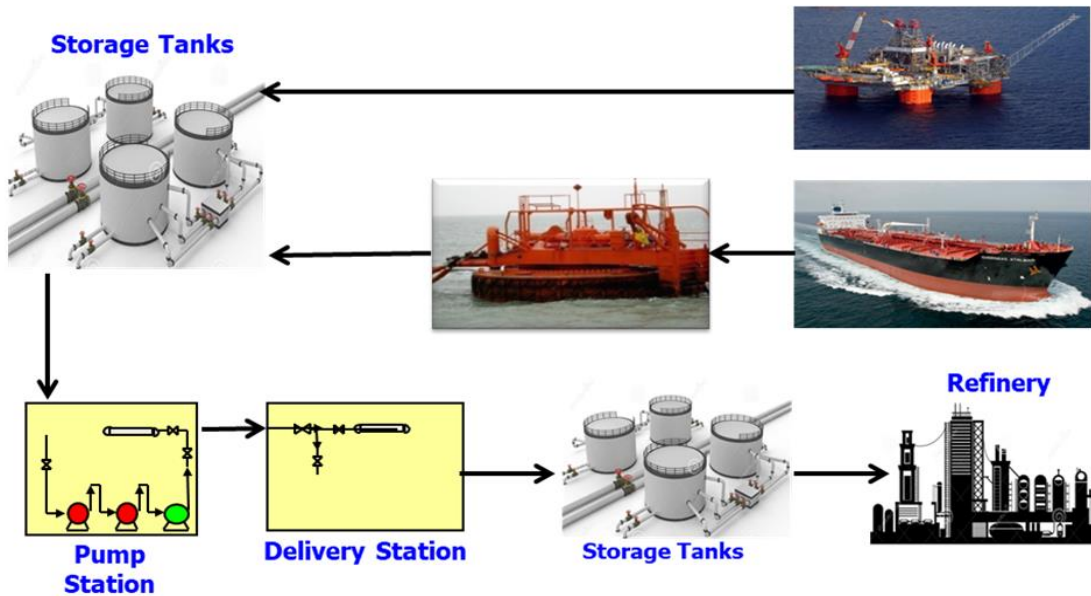
3. Pumping of crude oil from Paradip to Haldia

The crude oil is pumped from Paradip to Haldia using a combination of booster pumps and mainline pumps at Paradip and Balasore. Paradip station has got 5 mainline pumping units and 6 booster pumps similarly Balasore booster station has 3 mainline pumping units. The crude oil is pumped through a 30” OD 328 KM long pipeline (upto Haldia). The pipeline traverses through 04 Districts of Odisha i.e. Jagatsinghpur - 12.68 KM, Kendrapara- 54.879 KM, Bhadrak - 53.398 KM, and Balasore -106.123 KM. The pipeline enters into West Bengal through district Purba Medinipur and terminates at Haldia station.

Process flow chart:



Typical process of crude oil transportation



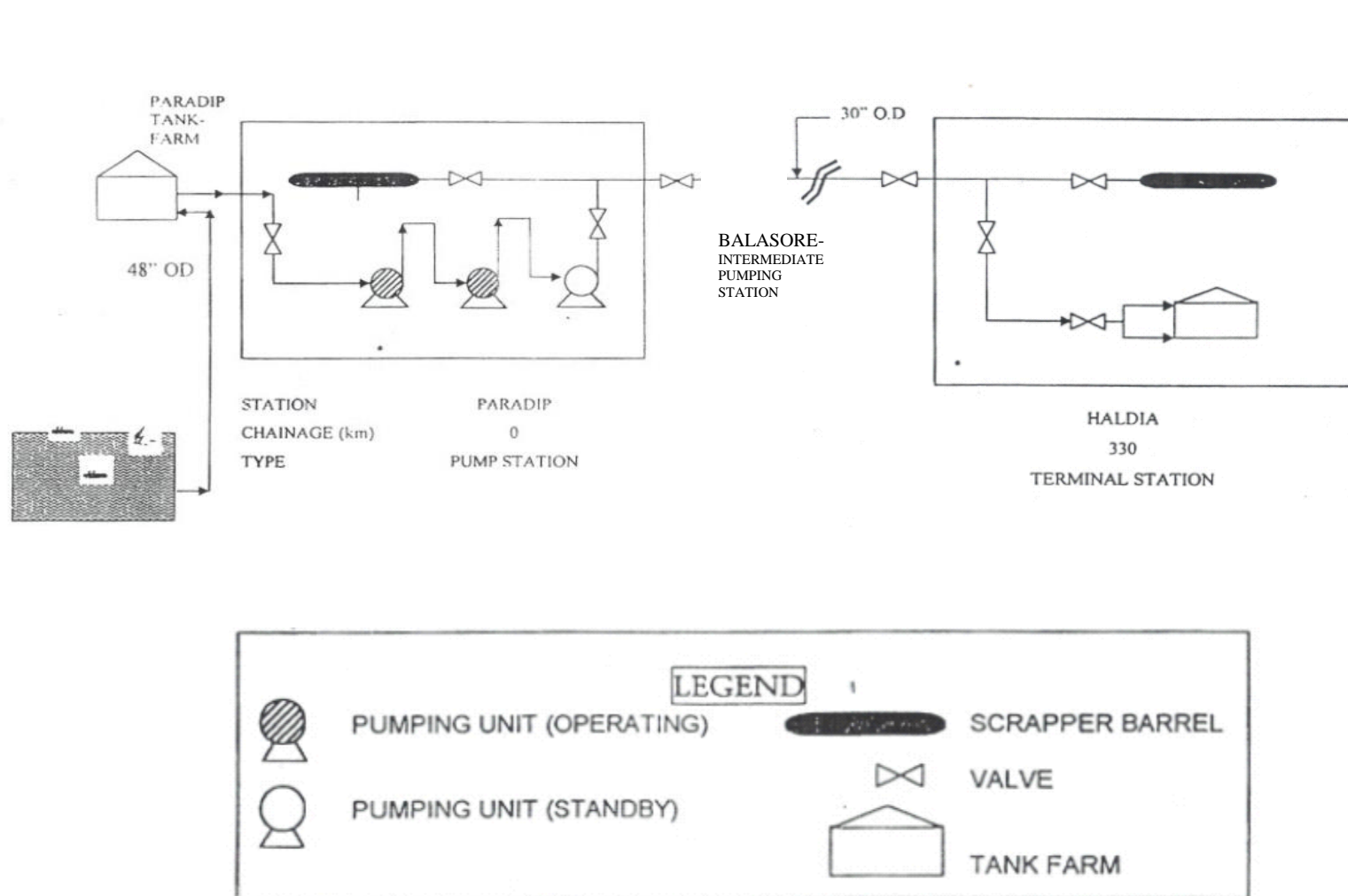


Fig- 1: Paradip- Haldia Section of PHBPL Schematic Flow Diagram

CHAPTER -3

MANPOWER DETAILS

Operation

Officers	:	53
Non-Officers	:	11
Fire Wing (CISF)	:	26
Security Wing (CISF)	:	48
Workers	:	188

Working Hours

General shift: Monday to Saturday : 0900-1730 Hrs
Weekly Off day : Sunday

Control Room in shifts round the clock with shift timing:

A- Shift	:	0600-1400 Hrs.
B- Shift	:	1400-2200 Hrs.
C- Shift	:	2200-0600 Hrs.

The pumping operation of oil terminal is carried out in 3 shifts in a day round the year. Each shift is of 8 hours. Morning shift starts from 0600 hrs.

CHAPTER - 4

PRODUCT/ BI-PRODUCT

4.1 The installation is dealing with the following product:

Crude Oil

4.2 It is only a storage location. No product is manufactured. Hence **there is no By-product.**

CHAPTER - 5

RAW MATERIAL INVENTORY

5.1 Raw Material Inventory

Following are the products and tank capacity up to which products in Terminal can be stored.

List of Storage Tanks in the Paradip Crude Oil Terminal

S. No.	Tank No	Dia x Ht (Meters)	Nominal Capacity (KL)	Position of Tank	Product
1	PT-01	79 X 13.5	60,000	AGFRVT	Crude Oil
2	PT-02	79 X 13.5	60,000	AGFRVT	Crude Oil
3	PT-03	79 X 13.5	60,000	AGFRVT	Crude Oil
4	PT-04	79 X 13.5	60,000	AGFRVT	Crude Oil
5	PT-05	79 X 13.5	60,000	AGFRVT	Crude Oil
6	PT-06	79 X 13.5	60,000	AGFRVT	Crude Oil
7	PT-07	79 X 13.5	60,000	AGFRVT	Crude Oil
8	PT-08	79 X 13.5	60,000	AGFRVT	Crude Oil
9	PT-09	79 X 13.5	60,000	AGFRVT	Crude Oil
10	PT-10	79 X 13.5	60,000	AGFRVT	Crude Oil
11	PT-11	79 X 13.5	60,000	AGFRVT	Crude Oil
12	PT-12	79 X 13.5	60,000	AGFRVT	Crude Oil
13	PT-13	79 X 13.5	60,000	AGFRVT	Crude Oil
14	PT-14	79 X 13.5	60,000	AGFRVT	Crude Oil
15	PT-15	79 X 13.5	60,000	AGFRVT	Crude Oil
16	PT-16	79 X 13.5	60,000	AGFRVT	Crude Oil
17	PT-17	79 X 13.5	60,000	AGFRVT	Crude Oil
18	PT-18	79 X 13.5	60,000	AGFRVT	Crude Oil
19	PT-19	79 X 13.5	60,000	AGFRVT	Crude Oil
20	PT-20	79 X 13.5	60,000	AGFRVT	Crude Oil

KL- Kiloliter

AGFRVT- Above Ground Floating Roof Vertical Tank

Design as per: API 650, 10 th edition Nov 98/ IS:803			
Shell course		Height	Thickness
	1 st	2.5 m	25 mm
	2 nd	2.5 m	20 mm
	3 rd	2.5 m	16 mm
	4 th	2.5 m	14 mm
	5 th	2.0 m	10 mm
	6 th	1.492 m	10 mm

CHAPTER- 6

INVENTORY OF HAZARDOUS SUBSTANCE

6.1 Inventory of Hazardous Substances:

All products in Paradip Crude Oil Terminal namely Crude Oil is of class “A” flammable liquid category. Maximum inventory of hazardous substances in the terminal is as follows:

Products	Maximum Storage Capacity (KL)
Crude Oil	12,00,000 KL
High Speed Diesel (HSD)	40 KL

6.2 Sludge:

Cleaning operation at the time of schedule Inspection & Maintenance of tanks (Once in every 10 years for each tank as per Clause 8.4 (c) of OISD-STD-129) crude oil sludge is collected from the storage tank, it is being processed as per guidelines laid in Hazardous waste consent given by State Pollution Control Board, Odisha IND-IV-HW-775/18458.

There is no other hazardous substance handled in the terminal.

CHAPTER – 7

INFORMATION ABOUT HAZARDOUS SUBSTANCES

Hazardous substance handled at Paradip Crude Oil Terminal is Crude Oil which falls in class “A” flammable liquid category.

Material Safety Data sheet of Crude Oil is attached as Annexure-III.

CHAPTER - 8

HAZARD IDENTIFICATION AND IDENTIFICATION OF MOST CREDIBLE HAZARD SCENARIO

Hazards associated with Paradip installation are mainly

1. Leak
2. Burst
3. Fire
4. Vapour Cloud Explosion

Emergencies at PHBPL, Paradip can be categorized into three broad levels on the basis of seriousness and response requirements, namely: –

- (a) **Level 1** : This is an emergency or an incident which Can be effectively and safely managed, and contained within the site, location or installation by the available resources; has no impact outside the site, location or installation.
- (b) **Level 2** : This is an emergency or an incident which – cannot be effectively and safely managed or contained at the location or installation by available resource and additional support is alerted or required; is having or has the potential to have an effect beyond the site, location or installation and where external support of mutual aid partner may be involved; is likely to be danger to life, the environment or to industrial assets or reputation.
- (c) **Level 3**: This is an emergency or an incident with off-site impact which could be catastrophic and is likely to affect the population, property and environment inside and outside the installation, and management and control is done by district administration. Although the Level-III emergency falls under the purview of District Authority but till they step in, it should be responsibility of the unit to manage the emergency.

Note: Level-I has been considered for fire drill followed with onsite emergency. However Level-II shall normally be considered as onsite emergency and Level-III as off-site emergency. Similarly in case of any emergency in ROW will be considered as offsite emergency and Level-III.

IDENTIFICATION OF MOST CREDIBLE SCENARIO

SCENARIO-1: FIRE IN EXTERNAL FLOATING ROOF CRUDE OIL STORAGE TANK

At present there are 20 crude oil tanks of 60,000 KLS (each) available at PHBPL Paradip. These tanks are main potential hazards in the installation. 'Slop over' and 'Boil over' are two incidences of violent eruption of boiling oil caused due to propagation of heat wave of burning oil downwards the tank on fire and conversion of bottom water into vapour. Another severity of the crude oil tank fire is intense radiation of heat. Leakage of crude oil from tanks may lead to excess oil spillage and unconfined vapour cloud explosion causing severe damage to life and property.

Fire water system in the installation is designed to meet the firewater flow requirement of two tank fires (roof sinking case).

In built fire fighting systems like water spray system, Fixed/ Semi-fixed Foam Pourer System, Automatic foam based rim seal fire protection system, High Volume Long Range Monitors have been provided in the tank as prevention measure.

Medium Expansion foam generators have been provided for oil spill fire inside tank dyke.

CAUSES: Oil spillage and Fire incidences with crude oil tanks may happen due to following reasons:

- Operational failure of tanks.
- Third party activity.
- Damage due to Natural calamities like Lightning, Cyclone, Earthquake, etc.
- External source of ignition.
- Leakages of oil through valves, pipe & fitting connected with the tanks.

CONSEQUENCES: Oil Spillage, Fire in Rim Seal area, Fire in dyke area etc.

EMERGENCY RESPONSE AND MANAGEMENT:

- Siren for emergency to be blown.
- Stop transfer of crude from and to the crude tanks.
- Close MOV and isolate the tank on fire and also the adjoining tanks.
- CISF (Fire) and IOCL fire combat team to respond to site.
- Operation of foam pourer system of tank on fire.
- Start cooling the adjacent tanks including the tank on fire.
- Position foam tender at fire site to fight fire, if required.
- As the radiation level near the tanks will be very high fire crew wearing fire proximity suit and shielded with water spray may approach for fire fighting.
- There is provision to transfer crude oil from tank on fire/ leakage to another safe tank via header/ booster pumps.

- Depending upon the temperature of tank on fire & site conditions, prudent decision may be taken for transferring crude oil.
- Open emergency exit gate for safe evacuation of personnel if required.
- Evacuate people from surrounding area of pump station to assembly area.
- Emergency control centre to be established.
- Medical centre to be established.
- Adequacy of fire water system to be checked.
- Mutual Aid Scheme and Disaster Management Plan to be activated involving District Authorities and emergency services.

MOBILIZATION REQUIRED:

MANPOWER: Co-ordinators

EQUIPMENT:

- Fire Fighting Equipment- Extinguishers, Foam Compound
- Fire Fighting Systems- Sprinkler system, foam pourer system, Foam tenders, Foam compound
- Cars, Jeep, Ambulance, etc.
- Communication Equipment

SCENARIO-2: LEAK IN THE PUMP STATION

CAUSES: Corrosion, Mechanical Failure, Operational Failure, Third Party Activity.

CONSEQUENCES: Oil Spillage, Fire Hazard

EMERGENCY RESPONSE AND MANAGEMENT:

- Prevent Ignition
- Stop Oil Spillage
- Clean the area

MOBILIZATION REQUIRED:

MANPOWER: Co-ordinators

EQUIPMENT: Fire Fighting Equipment- Extinguishers, Foam compound

SCENARIO-3: FIRE IN THE PUMP STATION

CAUSES:

- Ignition – Short Circuit, Static Electricity Generation, Spark from Engine Exhaust
- External Source of Ignition
- Lightening

CONSEQUENCES:

- Damage to Equipment and / or Structure
- Injuries

EMERGENCY RESPONSE AND MANAGEMENT:

- Extinguish Fire
- Cooling of neighboring equipment.

MOBILIZATION REQUIRED:

MANPOWER:

- Co-ordinators
- Fire Fighting Crew

EQUIPMENT:

- Fire Fighting Equipment
- Extinguishers
- Foam Concentrate
- Fire Tender
- Ambulance

SCENARIO-4: LEAK AND FIRE IN THE PUMP STATION

CAUSES:

- Corrosion
- Mechanical Failure
- Operational Failure
- Third Party Activity
- Damage to the installation with malicious intentions of the third party (Attempt of pilferage, riots etc.)
- External Source of Ignition
- Lightening

CONSEQUENCES:

- Oil Spillage

- Fire
- Damage to Equipment and/or Structure
- Injuries

EMERGENCY RESPONSE AND MANAGEMENT:

- Stop Oil Spillage
- Extinguish Fire
- Clean the area
- Cooling of the Neighboring Equipment.

MOBILIZATION REQUIRED:

MANPOWER:

- Co-ordinators
- Fire Fighting Crew
- Police / Home Guards / District / P.W.D. Authorities

EQUIPMENT :

- Fire Fighting Equipment: Fire Tender, Fire Extinguishers, Foam Concentrate
- Communication Equipment
- Portable Generators, Cables, Bulbs etc.
- Mainline Emergency Equipment

SCENARIO-5: LEAK OF PIPELINE IN OPEN FIELD

CAUSES:

- Corrosion, Mechanical Failure,
- Third Party Activities: Damage to the pipeline due to the construction activity in the vicinity of the pipeline, Damage to the pipeline with malicious intentions of the third party (attempt for pillage, riots etc.)
- Damage due to Natural Calamities: Breaches due to floods, Earthquake, Cyclone

CONSEQUENCES: Oil Spillage, Fire Hazard

EMERGENCY RESPONSE AND MANAGEMENT:

- Cordon the Area
- Prevent Ignition

- Stop Oil Spillage
- Clean the area

MOBILIZATION REQUIRED:

MANPOWER: Co-ordinators, Police / Home Guard, Labour

EQUIPMENT:

- Fire Fighting Equipment- Extinguishers, Foam Compound
- Cars, Jeep, etc.
- Communication Equipment
- Mainline Emergency Equipment

SCENARIO-6: LEAK OF THE PIPELINE IN CANAL/ RIVER CROSSINGS etc.

CAUSES:

- Corrosion
- Mechanical Failure
- Third Party Activities:
 - Damage to the pipeline due to the construction activity in the vicinity of the pipeline.
 - Damage to the pipeline with malicious intentions of the third party (attempt for pillage, riots etc.)
- Damage due to Natural Calamities:
 - Breaches due to floods
 - Earthquake
 - Cyclone
 - Washouts

CONSEQUENCES:

- Oil Spillage
- Fire Hazard
- Water Pollution

EMERGENCY RESPONSE AND MANAGEMENT:

- Take shut down of the affected pipeline
- Stop Oil Spillage by closing upstream/downstream valves
- Inform senior management
- Immediately inform to police, local fire brigade, irrigation/ PWD /Railway/District/Environment and pollution control board authorities.
- Rush to site with required tools and tackles
- Cordon off spill site

- Contact vendors that specializes in oil spill management
- Make arrangement to contain and recover oil spillage
- Use appropriate Personal Protection Equipment
- Spray Oil Dispersant
- Arrange necessary awareness/announcement program for affected people

MOBILIZATION REQUIRED:

MANPOWER:

- Co-ordinators
- Police / Home Guards / District / PWD / Irrigation Authorities
- State Environment/Pollution control board authorities
- Labour
- Under water services professionals, other vendors

EQUIPMENT:

- Fire Fighting Equipment
- Fire Extinguishers
- Foam Concentrate
- Safety equipment viz; helmet, explosimeter
- Oil tankers, Jeep, etc.
- Communication Equipment
- Coffer dam material
- Drums, boats, lifting equipment etc.
- Oil Dispersant
- Mainline Emergency Equipment

SCENARIO-7: BURST OF THE PIPELINE IN PUMP STATION

CAUSES:

- Corrosion
- Mechanical Failure
- Third Party Activities
- Damage to the pipeline due to the construction activity in the vicinity of the pipeline.
- Damage to the pipeline with malicious intentions of the third party (attempt for pillage, riots etc.).
- Damage due to Natural Calamities
- Breaches due to floods
- Earthquake
- Cyclone

CONSEQUENCES:

- Oil Spillage
- Fire Hazard
- Pollution of the Irrigated land.
- Water Pollution.

EMERGENCY RESPONSE AND MANAGEMENT:

- Prevent Ignition
- Stop Oil Spillage
- Contain Spread of Oil
- Reclaim Oil
- Clean the Area

MOBILIZATION REQUIRED:

MANPOWER:

- Co-ordinators
- Supervisory / Non-Supervisory Personnel
- Fire Fighting Crew
- Labour

EQUIPMENT:

Fire Fighting Equipment-Fire Tender, Extinguishers, Foam Concentrate
Equipment for constructing the bunds to contain spread of Oil
Equipment for Recovery of Oil: Hoses, buckets, barrels. Pneumatic Pumps etc.
Oil dispersant
Emergency Repairs Equipment

SCENARIO-8: BURST, FIRE & EXPLOSION IN THE PUMP STATION

CAUSES

- Corrosion
- Mechanical Failure
- Ignition – short circuit, static electricity generation, spark from Engine exhaust
- Third Party activity
- Spillage of oil from tank/valves/piping etc.

CONSEQUENCES:

- Oil Spillage
- Fire
- Explosion (Confined or unconfined)

- Damage to Equipment and / or Structure
- Injuries

EMERGENCY RESPONSE AND MANAGEMENT:

- Stop Oil Spillage
- Extinguish Fire
- Contain spread of oil
- Evacuate People
- Reclaim Oil
- Clean the Area

CHECK LIST FOR MOBILIZATION REQUIRED:

MANPOWER:

- Co-ordinators
- Supervisory / Non-Supervisory Personnel from Base & other stations.
- Fire Fighting Crew.
- Police / Home Guard / District / PWD Authorities.

EQUIPMENT:

- Fire Fighting Equipment- Fire Tender, Extinguishers, Foam Concentrate
- Equipment for constructing the bunds to contain spread of Oil:
- Equipment for recovery of oil: Barrels, Pneumatic pumps etc.
- Tank trucks for transportation of recovered oil.
- Tank lorries for transportation of labour and equipment.
- Jeeps
- Communication Equipment.
- Mobile Address System
- Ambulance
- Mainline emergency equipment.

SCENARIO-9: FLOOD & CYCLONE:

Due to heavy rain or cyclone, water level in in surrounding areas may start rising. State Gov. issues warning of Flood

A) Emergency Flood Plan

Flood Plans can enable a flexible response to problems caused by flooding. Although barriers may protect potential flood areas from predictable tidal or storm surges, flooding can occur at any time.

Flood Warnings

A typical flood warning time is around 30 to 60 minutes by Govt.

Sample flood warning messages are:

- Flood Alert – Flooding is possible
- Flood Warning – Flooding of homes, businesses and main roads is expected
- Severe Flood Warning – Severe flooding may cause Imminent danger
- All Clear – No Flood Alerts or Warnings are in force

EMERGENCY RESPONSE AND MANAGEMENT:

When a flood warning message is received, Emergency response & Disaster Management Plan will be activated by blowing sirens. Depending upon the scale of potential flooding, the main management includes-

- Care of evacuated, hurt people
- Protecting of station utilities and taking shutdown if needed
- Availability of transport
- Providing emergency health advice
- Providing road barriers and signs
- Coordinating emergency support
- Control, fires and leakages, if any
- Minimize environmental dangers
- Liaison with ambulance services and medical services
- Medications, warm clothing, sealed food, blankets, matches, candles, flashlights, portable radio, spare batteries, rubber gloves, personal documents
- Turn off electricity and gas

Sandbags

- Fill sandbags not more than $\frac{3}{4}$ full
- Lay them in layers with each row tight to each other, end to end
- Stamp them down before laying another row on top
- If a wall is more than two sandbags high, place a double line of bottom sandbags, followed by a second double line, then a single line on top.
- Make sandbags with compost bags, carrier bags or pillowcases filled with sand or earth
- Put a plastic sheet down first to act as an extra seal
- Protect all water entry points including air bricks, air vents and utility openings
- If gas vents are sealed, disconnect any gas supply
- Seals around doors and windows should be made watertight
- It can take 60 sandbags to correctly seal an external door

B) CONTINGENCY PLAN FOR THE CYCLONE FORECAST AT PARADIP

In case the cyclone forecast materializes at Paradip, following actions and the contingencies plan to be prepared in advance & percolated down below to deal with the situation that may arise due to the cyclone at Paradip.

- I. Pre–Cyclone Preparedness to safeguard various machineries and manpower
- II. Action Plan during arrival of Cyclone at Paradip
- III. Post – Restoration and restarting of station operation

I. Pre–Cyclone Preparedness

As per ERDMP, the cyclone/storm has categorized as Disaster and as per severity may be declared as Level-3 disaster. Accordingly following plans have been made to safeguard the machineries so that minimum damage is caused by flooding. The plan is to be executed depending on situation and forecast regarding level and strength of cyclone.

S. No.	Activity
1	Inform CISF to prepare for the situation
2	Letters to DM, Coast Guard, Police etc. for assistance
3	Sending 'SITREP' to ERPL-II & PLHO
4	SPM system & NOJ SPM- ensure all activities as per Offshore Contingency Plan for severe cyclone. NOJ- Marine Unloading Arms and other facilities to be secured suitably.
5	<ul style="list-style-type: none">• Arrangement of Sand bags to make guard wall at the South Gate and to plug the expansion joints and peep holes as far as possible.• Fill sandbags not more that $\frac{3}{4}$ full• Lay them in layers with each row tight to each other, end to end• Stamp them down before laying another row on top• If a wall is more than two sandbags high, place a double line of bottom sandbags, followed by a second double line, then a single line on top.• Put a plastic sheet down first to act as an extra seal
6	<ul style="list-style-type: none">• All roof covers etc. of temporary sheds/ structures to be properly secured.• To advise Construction group (if any) about the above.
7	Crude oil tanks should have ullage to receive excess rain water. Crude oil tank roof to be lowered to avoid damage to rolling ladders due to high wind.
8	Chains of chain pulley blocks in sheds should be properly secured to avoid swinging of the same. Similarly the booms of cranes etc. should be down to the ground.
9	HSD tanks in station and colony for DG should be filled up.
10	Maximizing pumping from Paradip, so that in the event of happening of

disaster due to cyclone, and shutdown of Paradip for length of period, dry out of refineries can be avoided/ minimized.

- 11 Covering critical equipment like MLPUs, Boosters, etc. with plastic sheets to prevent mud/ sand entering the same
- 12 Taking back-up of important data of individuals to avoid loss of the same in the event of inundation of the total facility.
- 13 Arrangement of Torches/ batteries/ Mobile charges etc. (to be kept in Administrative building) for use during emergency
- 14 The available inflatable light be shifted to Admin. Building
- 15 Explore for portable emergency DG sets on hire
- 16 Identifying control and monitoring equipment that can be shifted to higher safe place
- 17 Evacuation of maximum Oil from OWS to tanks
- 18 To instruct the vehicle contractors to fill up the diesel tanks of the vehicles
- 19 Instruct Canteen and GH contractor to stock-up the food essentials, specially non-perishable types to cope with post cyclone scenario
- 20 To take cash advances to deal with post cyclone scenario
- 21 Arrangement of life jackets and life buoys
- 22 Placement of Mattresses/ Blanket/ drinking water/ dry eatables/ mosquito repellent coils/ candles etc. in the administrative building
- 23 Shifting of the canteen facility (minimum essential items) to Recreation room in the first floor
- 24 Stock-up the First Aid boxes, including medicines like snake bite serum and for water borne diseases
- 25 Shifting of computers/ Printers and important documents from Ground floor to first floor
- 26 Shifting of critical & valuable spare from Material store (in GF) to safe place (say FF of store building)
- 27 To ensure that doors and windows of buildings are closed.

II. Action Plan during arrival of Cyclone at Paradip Station

- 1 Declare the situation as Disaster as per situation
- 2 Activation of Alternate Disaster Control Center in the colony, if required
- 3 Order for Shutdown of the station and Evacuation to safe places
- 4 Ensure availability of vehicle round-the-clock
- 5 To decide manning of station as per situation at site

III. Post – Restoration and restarting of station operation

- 1 Take stock of Pipeline locations conditions
- 2 Restore normalcy of Pipeline activities.
- 3 Furnish situation Report

Note: Applicability of the activities at S. No. 5, 11, 12, 14, 15, 16, 21, 22, 23, 25 and 26 would be decided at an appropriate time depending upon the situation.

CHAPTER-9

FACILITIES AVAILABLE FOR EMERGENCY COMBAT

- 10.1** Various types of fire fighting facilities are provided at the pump station as per Factories Act, 1948, Orissa Factories Rules-1950 & OISD-STD-117 to meet any exigencies arising out of fire.
- 10.2** These facilities include:
- a. Fire water storage tanks
 - b. Make up water source
 - c. Fire fighting pumping units
 - d. Jockey Pumps
 - e. Fire water network with fire hydrant & water-cum-foam monitors.
 - f. Fire protection system of crude oil tanks
 - Automatic rim seal fire protection system
 - Water spray system.
 - Fixed & semi-fixed foam pourer system
 - High volume long range monitors
 - Medium Expansion foam generators on tank dyke
 - g. Smoke/ Heat detection system in Control Room, MCC Room Pump Shed and Booster Shed & UV/IR detection system at mainline pump shed.
 - h. Hydrocarbon Detection System in pump station, Tank Farm & COT Area
 - i. Emergency Tool kit
 - j. Manual call point system (Break Glass type) in tank farm (42)
 - k. CO2 flooding system in HT Rooms, MCC I, MCC II & MCC-III.
 - l. Hoses, nozzles, extinguishers & accessories
 - m. Source of Water Supply
 - From Refinery
 - n. A fire station, manned (26 as on date) by CISF (Fire Wing), is established to control any type of fire and emergency situations and provided with 2 Foam tenders (4000 L water + 6000 L Foam each).

COMPARATIVE ANALYSIS OF PROVISION OF VARIOUS APPLICABLE STANDARDS VIS-À-VIS AVAILABILITY OF FIRE FIGHTING FACILITIES

S.N.	Description	Requirement as per																										
		The Factories Act 1948/ Orissa Factories Rules- 1950	OISD-STD-117: July 2012	Availability at PHBPL, Paradip																								
1	Portable Fire Extinguishers	Class A (light hazard): one extinguisher and two fire buckets per compartment of building. (25 m Max travel distance)	As per clause no. 4.6.1	Availability of extinguishers <table border="1"> <tr> <td colspan="2">DCP Extinguishers:</td> </tr> <tr> <td>9 Kg.</td> <td>101 Nos.</td> </tr> <tr> <td>25 Kg.</td> <td>11 Nos.</td> </tr> <tr> <td>75 Kg.</td> <td>1 No.</td> </tr> <tr> <td colspan="2">CO2 Extinguishers:</td> </tr> <tr> <td>2Kg</td> <td>55 Nos.</td> </tr> <tr> <td>4.5 Kg.-</td> <td>88 Nos.</td> </tr> <tr> <td>6.8 Kg</td> <td>4 Nos.</td> </tr> <tr> <td colspan="2">Clean Agent Extinguishers:</td> </tr> <tr> <td>2 Kg</td> <td>18 Nos.</td> </tr> <tr> <td>4 Kg.</td> <td>8 Nos.</td> </tr> <tr> <td>6 Kg</td> <td>8 Nos.</td> </tr> </table>	DCP Extinguishers:		9 Kg.	101 Nos.	25 Kg.	11 Nos.	75 Kg.	1 No.	CO2 Extinguishers:		2Kg	55 Nos.	4.5 Kg.-	88 Nos.	6.8 Kg	4 Nos.	Clean Agent Extinguishers:		2 Kg	18 Nos.	4 Kg.	8 Nos.	6 Kg	8 Nos.
		DCP Extinguishers:																										
9 Kg.	101 Nos.																											
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6.8 Kg	4 Nos.																											
Clean Agent Extinguishers:																												
2 Kg	18 Nos.																											
4 Kg.	8 Nos.																											
6 Kg	8 Nos.																											
	One fire extinguisher (foam type/CO2/DCP) per 60 m2 of floor area (15 m max travel distance)																											
2	Fire Water	Minimum 450 KL in static tanks. Continuous supply for 100 Minutes.	Storage cap. of total 4 hrs. aggregate pumping capacity	Storage capacity 20000 KL water – 2 nos. x 10000 KL each (Above ground tanks H=14.48 M, D=30 M) ❖ MS (internal coated) over ground Firewater network covering all facilities with 195 double headed hydrants, 64 water cum foam monitors, & 54 High volume long range monitors ❖ 06 Km, 28” dia header in T/F ❖ 1.3 Km, 14”dia in P/S & up to 6.6 KV switch yard ❖ 2 KM, 24” dia Header in New T/F																								
		Fire water distribution network, automatic sprinklers and hydrants Header size min. 15 cm (5.9 inch) capable of supplying 4.5 KL/Min @ 7 Kg/Sq. cm pressure.	Fire water network covering all probable hazards																									

		Trailer pump/Vehicle for towing (per 4 trailer pumps) for requirement more than 550 LPM (33 KL/Hr.)	4003.5 KL/Hr. as per clause no. 4.3.2.1	❖ 14.0 Km sprinkler line & foam line FF Pumps of capacity 600 KL/Hr. each- 9 Nos.(Engine Driven), 1 No. (Motor Driven) Jockey pump of cap. 250 KL/Hr. – 2 Nos., 50 KL/Hr – 2 Nos. Fire tenders -2 Nos.
5	Fire Drills	Quarterly	Monthly	Conducted once in a month.
6	Fire fighting Accessories	As per schedule in Rule 61 including BA set	As per clause 4.6.3	Available. List of accessories is given on next page BA set is available

i) **Nozzles & Accessories**

Following quantities of fire fighting nozzles are available in the fire station.

Name of item	Availability
Jet nozzles with branch pipe (IS : 903)	125
Fog nozzles (IS : 952)	08
Universal nozzles (IS : 2171)	94
Foam making branch pipes (IS-2097)	18
ACCESSORIES	
Sand Scoops	12
Safety Helmets	200
Water Curtain Nozzles	10
Stretcher	02
First Aid Box	03
Rubber hand gloves for Electrical jobs	06
Explosimeter	10
Fire Proximity suit	06
Resuscitator	02
Electric Siren	03
Hand operated siren	02
Water jel blanket	05
Red/Green flag for fire drill	Available
Positive pressure type self contained Breathing Apparatus with spare cylinder (45 min. duration)	02 Sets

ii) **Aqueous Film Forming Foam (AFFF) Compound**

For extinguishing a large, bulk oil fire in a tank or sump, mechanical foam has been established as a standard medium and accordingly AFFF is provided and used in the stations:

Item	Availability (KL)
AFFF Concentrate	195

iii) Siren

Siren for declaring the major emergency

The major emergency will be declared by blowing the siren from Station Control Room. The mode of siren is as under (as letter received from OISD Ref No. OISD/MO dated Nov'04, 2013 for changing Fire Siren code as per the ERDMP, PNGRB regulation -2010):

Type of emergency	Siren code
Air Raid Protection	Siren for two minutes as per Civil Defence Instruction
Level 1	Wailing type siren for two minutes
Level 2	Same siren as in the case of Level 1 it will be sounded three times with an interval of 60 seconds in between.
Level 3	Same siren as in the case of Level 1 except that it will be sounded three times with an interval of 60 seconds in between.
All Clear	Straight run siren for two minutes.
Siren testing	Straight run siren for two minutes.

Location of siren place is given below:

Location	Nos
Paradip	Electrical- On the roof of Fire station, MCC-02 building & Switch yard building Hand Operated- Near Control building

10.3 Communication

Communication is the most critical and vital part of any emergency Plan. The emergency communication can be divided in following two parts –

- A - Inward communication – from site to communicate the emergency
- B - Outward communication – From control room / Disaster control room/fire control room to other internal / external agencies to communicate the emergency.

A - Inward communication – from site to communicate the emergency

Each station is having a well-established system to communicate the emergency to designated locations by OFC, fire siren etc., Following systems are provided –

Fire Alarm System: Break glass type fire alarm points (MCPs) have been located at strategic locations in the plant and as well as other storage locations. A control

panel is installed in Station Control Room and repeated in fire control room for showing Fire call location.

Internal Fire Call Telephones: The station has also been provided with a well distributed internal telephone system to communicate the emergency dedicated telephone numbers as follows are available all the time.

Station	Emergency call No
Paradip	202, 112, 142,144 (To dial from other station, prefix 50 before the no.)

Hand held Walkie-Talkies: The walkie-talkie sets are being used by various departments for communication purpose. We have provided a single channel no. 1 is used for communication. Walkie talkie sets are available at following locations at all stations.

- Control Room,CISF, Watch Towers, HODs

10.4 Transport Facilities

- Hired Jeep:-10
- Personal vehicles of employees

10.5 Other Emergency EQUIPMENT

Special equipment required for station and pipeline emergencies is detailed in Annexure-A.

These equipment are specially protected and stored in a dedicated emergency area, away from the general stores. The equipment must be regularly inspected, maintained and replaced, as necessary. It must not be used for general maintenance work.

EMERGENCY CONTROL CENTER (ECC)	ALTERNATE EMERGENCY CONTROL CENTER	RESOURCE REQUIREMENT	INFORMATION CENTRE
Paradip Station Control room	1.CGM Office 2.Alternate to alternate control room- Pipeline township guest house	<ul style="list-style-type: none"> • Table / Chairs for 8 persons • Telephones,Walkie talkie sets • Telephone directory, • ERDMP document • Lists of Co-ordinators, • Public Address System • Station plot plan 	Main gate

10.6 Assembly point at stations-In case of emergency / major accident / disaster, assembly points have been identified and marked in the pipeline area for assembling of people for head counting / transportation to a safe place. The location of Assembly point is :

Assembly Point	Incharge	Alternate In charge	Escape Route
Near North Entry Gate	In-charge Mat.Dept	Shift In-charge	Through main gate

*Drawing indicating emergency escape route is attached as Annexure-V.

10.7 Medical Services & Ambulance Van:

- i) Paradip Port Trust Hospital
- ii) Paradip Hospital: (Run by Govt. of Orissa)
- iii) Paradip Refinery Hospital

10.8 First Aid arrangement:-

- 3 Nos. of first –aid boxes are available one each at Control room, Fire station

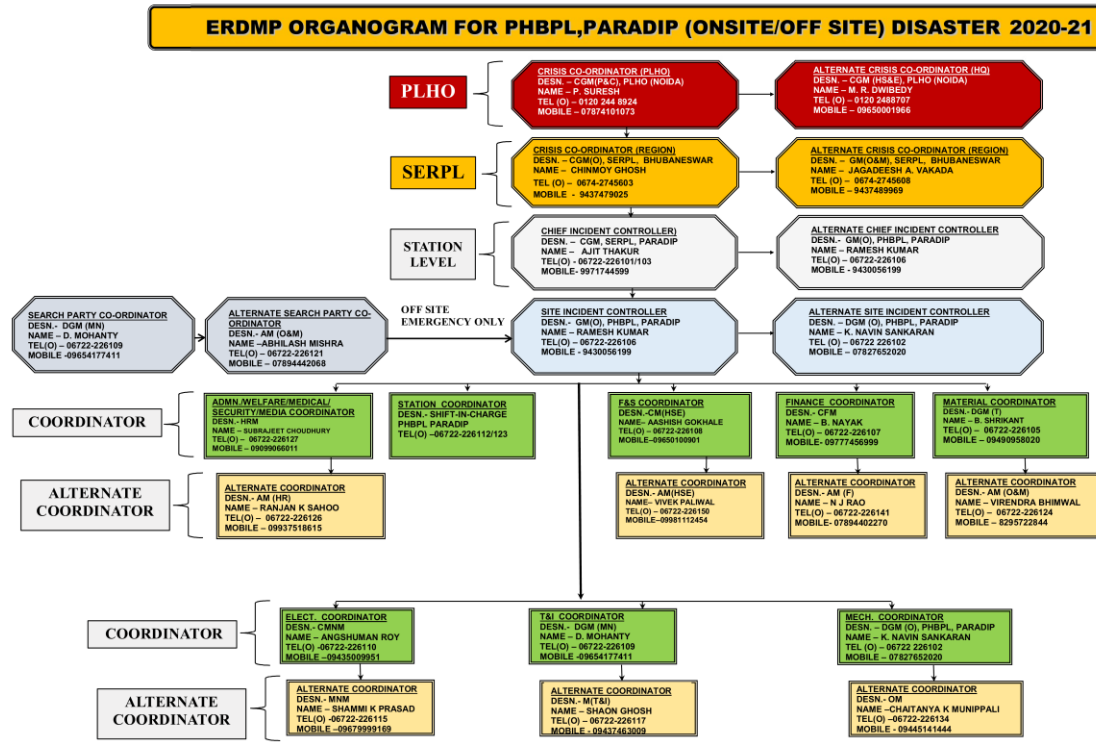
10.9 Personal Protective EQUIPMENT:

- Safety shoes and Safety helmets
- Safety Nose mask
- Safety shower
- Full body harness
- Emergency kit as per OISD 117: One set
- Safety torch

CHAPTER-10

EMERGENCY COMMAND STRUCTURE

10.1 To Combat Emergency at Paradip crude Oil Terminal, the command structures is as below



10.2 Emergency shall be declared by the Works Main Controller through public address system (portable loud speaker) and / or through blowing siren.

CHAPTER- 11

ROLE OF KEY PERSONS

11.1 Works Main Controller (Chief Incident controller)

- On getting the message of the disaster, he will rush to the site and start functioning.
- He will ensure the functioning of the necessary organisation structure as shown in the Organogram. Assess the scale of emergency procedure and put disaster plan in action.
- He will be fully responsible to mobilise all the Co-ordinators and will declare the Danger Zones.
- To activate station shutdowns through the Station Co-ordinator (Shift Engineer)
- He will be fully responsible to pass all the information about the incident, magnitude of the disaster, combating operations and the number of casualties (if any) to Unit Head and SERPL Head.
- He will advise unit Head about the requirement of men and materials to the site.
- He will contact ED, Refinery to appraise the magnitude of the disaster for their information and necessary help.
- He will inform all statutory bodies regarding the disaster through Administration Co-ordinator.
- He will contact with the outside agencies to seek their help as per requirement through Administration Co-ordinator.
- Contact District Magistrate, Superintendent of Police and inform the nature of incident, personal injured / dead etc.
- Maintain speculative continuous review of possible development and assess these to determine most probable course of events.
- Ensure that casualties are receiving adequate attention arrange for additional help if required and ensure that relatives are informed.
- Control rehabilitation of affected areas on cessation of the emergency.

11.2 Site Incident Controller

- He will ensure sounding of fire siren to declare emergency.
- He will be responsible to stop the pumping operation at any abnormal conditions.
- He will assist Control room to inform other stations to stop pumping operation, when situation demands.
- He will inform WMC, Unit Head Quarter and other stations about disaster.
- He will take care of all the station communication, be in constant touch with the Search Party at side and assist them in receiving / conveying message and giving feedback in case of emergency on the mainline.
- He will assist WMC as and when required.

- To ensure that all emergency procedure are followed up.
- He will maintain follow-up with unit / SERPL Office and ensure men and materials have been dispatched to site as required by the WMC.
- To maintain a speculative continuous review of all developments and assess these to determine the most probable course of events.
- He will be responsible to start pumping operation immediately after getting the clearance from WMC.
- After resumption of pumping operation he will ensure that all preventive safe practices are being followed.
- Inform Refinery hospital for immediate help.

11.3 Fire Combat team

Fire Combat team leader

- To inform shift In-charge to sound fire siren
- To reach fire site and start F/F operation.
- To coordinate with Control room to regulate water pressure to meet the requirement of flow of water to fire site
- To coordinate with CISF for F/F & rescue operation
- To liaison with Mutual Aid Partners for Firefighting. Call for additional resources if required.
- To give all clear signal to Control Room when everything is normal.
- To organize de-briefing session after the mock fire drill.

Team Members:

- Work as per instruction of team leader

11.4 Rescue team

Rescue team leader

- Take control of First Aid box and stretchers.
- Set a first aid centre and provide first aid to injured
- Transport injured to the hospital.
- To remove any unwanted material from fire site.
- Manning communication system at site.
- Liasoning for vehicle requirement at site.

Team Member

- Work as per Instruction of team leader.

11.5 Auxiliary team

Auxiliary team leader

- Start F/F pump, Foam pump and man these locations.
- To assist Fire Combat team by supplying all material.
- Stoppage of all ongoing works.
- Evacuation of labours and other personnel.
- Advise security to open emergency gates.
- Directing Mutual Aid Members and outside agencies to fire spot.
- Help Fire combat team in F/F if required.
- Operation of water replenishment system for fire water tank.
- To test and commission the affected pipeline / equipment after the repairing work is over and to issue work completion certificate to Works Main Controller.

Team Member

- Work as per instruction of team leader

CHAPTER-12

ACTION PLAN FOR ON-SITE EMERGENCY PLAN

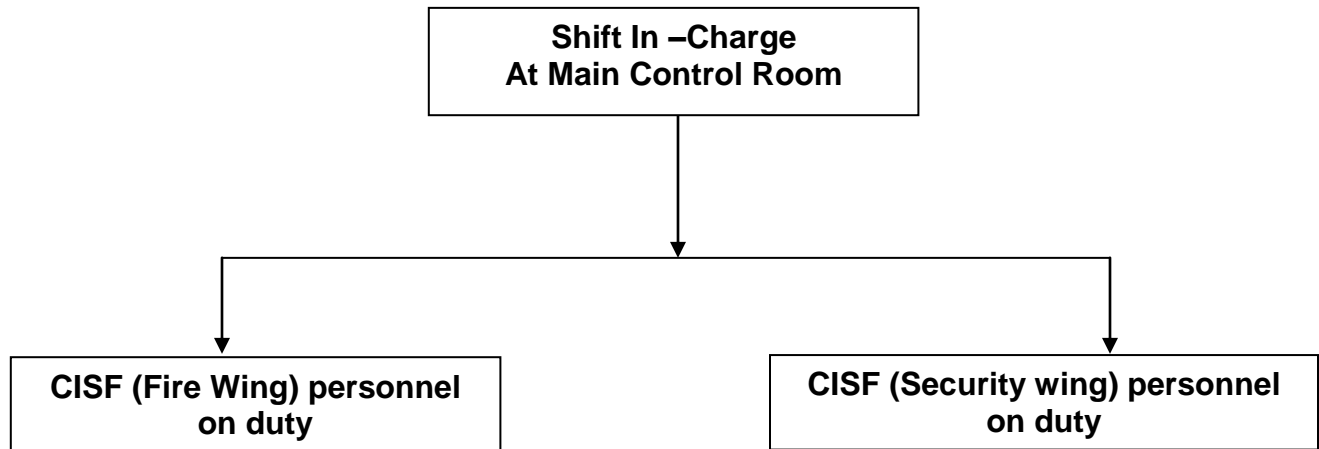
Step No.	Initiator	Action To Take
1	The person noticing the emergency	<ul style="list-style-type: none">• Shout “Fire....Fire....Fire” to draw the attention of nearby people by shouting• Immediately operate the nearest Manual call point• Attempt to extinguish the fire with the equipment available nearby.
2	Works Main Controller (WMC)	<ul style="list-style-type: none">• On getting the message of the emergency/disaster, he will rush to the site and start functioning.• He will ensure the functioning of the necessary organization structure as shown in the Organogram. Assess the scale of emergency procedure and put disaster plan in action.• He will be fully responsible to mobilize all the Co-ordinators and will declare the Danger Zones.• To activate station shutdowns through the Station Co-ordinator (Shift Engineer)• He will be fully responsible to pass all the information about the incident, magnitude of the disaster, combating operations and the number of casualties (if any) to Unit Head and SERPL Head.• He will advise unit Head about the requirement of men and materials to the site.• He will contact ED, Refinery to appraise the magnitude of the disaster for their information and necessary help.• He will inform all statutory bodies regarding the disaster through Administration Co-ordinator.• He will contact with the outside agencies to seek their help as per requirement through Administration Co-ordinator.• Contact District Magistrate, Superintendent of Police and inform the nature of incident, personal injured / dead etc.• Maintain speculative continuous review of possible development and assess these to determine most probable course of events.

		<ul style="list-style-type: none"> • Ensure that casualties are receiving adequate attention arrange for additional help if required and ensure that relatives are informed. • Control rehabilitation of affected areas on cessation of the emergency.
3	Site Incident Controller (SIC)	<ul style="list-style-type: none"> • He will ensure sounding of fire siren to declare emergency • He will be responsible to stop the pumping operation at any abnormal conditions. • He will assist Central Dispatch to inform other stations to stop pumping operation, when situation demands. • He will inform WMC, Unit Head Quarter and other stations about disaster. • He will take care of all the station communication, be in constant touch with the Search Party at side and assist them in receiving / conveying message and giving feedback in case of emergency on the mainline. • He will assist WMC as and when required. • To ensure that all emergency procedure are followed up. • He will maintain follow-up with unit / SERPL Office and ensure men and materials have been dispatched to site as required by the WMC. • To maintain a speculative continuous review of all developments and assess these to determine the most probable course of events. • He will be responsible to start pumping operation immediately after getting the clearance from WMC. • After resumption of pumping operation he will ensure that all preventive safe practices are being followed. • Inform Refinery hospital for immediate help.
4	Fire Combat Team Leader	<ul style="list-style-type: none"> • To inform shift In-charge to sound fire siren • To reach fire site and start F/F operation. • To coordinate with control room to regulate water pressure to meet the requirement of flow of water to fire site • To coordinate with CISF for F/F & rescue operation • To liaison with Mutual Aid Partners for Firefighting. Call for additional resources if

		<p>required.</p> <ul style="list-style-type: none"> • To give all clear signal to Control Room when everything is in normal. • To organize de-briefing session after the mock fire drill
5.	Rescue Team Leader (RTL)	<ul style="list-style-type: none"> • Take control of First Aid box and stretchers. • Set a first aid centre and provide first aid to injured • Transport injured to the hospital. • To remove any unwanted material from fire site. • Manning communication system at site. • Liasoning for vehicle requirement at site.
6.	Auxiliary Team Leader (ATL)	<ul style="list-style-type: none"> • Start F/F pump, Foam pump and man these locations. • To assist Fire Combat team by supplying all material. • Stoppage of all ongoing works. • Evacuation of labours and other personnel. • Advise security to open emergency gates. • Directing Mutual Aid Members and outside agencies to fire spot. • Help Fire combat team in F/F if required. • Operation of water replenishment system for fire water tank. • To test and commission the affected pipeline / equipment after the repairing work is over and to issue work completion certificate to Works Main Controller.
7.	Team Members	Each of the team members should follow the instruction of concerned team leader to mitigate the emergency

CHAPTER-13

SILENT HOUR COMMAND STRUCTURE



Role of key Personnel in silent command structure

- Silent hour is the time when General shift people are not available
- i) CISF Fire personnel in shift duty are available in installations for 24 hours.
- ii) They do carry out visual inspection / monitor of all tanks / Pipeline and other systems.
- iii) CISF Security personnel take round of the station regularly.
- iv) CISF Security /Fire personnel seeing fire will fight fire with nearby extinguisher in case of small fire. For oil fire/electric fire/ fire, they will raise the alarm by shouting “Fire” “Fire” and break the nearby “manual call point”. They have also available with walky-talky set. They will inform to Control room or Fire station by walky-talky.
- v) Officer on shift duty at Control Room shall inform to Works Main Controller for help. Details are given below.
 - On getting the information / seeking the emergency in the pump station, Shift Engineer should take the station under Emergency Shut Down and immediately inform down stations, CISF fire wing.
 - Subsequent to operation of ESD, Shift Engineer should sound the fire siren.
 - Tech. Attendant should rush to firefighting pumping unit.

- Shift Engineer of Station should communicate the emergency message to SIC apart from Paradip Refinery fire station (through fire station), all co-ordinators and Paradip refinery hospital.
- CISF Fire Wing & one Shift Engineer should assess the scene and start fire fighting operation / try to control the situation.
- One Shift Engineer should man the control room.
- Available CISF security personnel in station should also be involved to assist the crew fighting fire / trying to control the situation.

CHAPTER-14

ACTIVATION AND CLOSING PROCEDURE

Organizing Onsite mock drill

Purpose:

- To assess preparedness of employees, Contract workers, CISF personnel (if available), government agencies and Mutual aid partners in case of any exigency at the station.
- To check performance of the fire protection system and equipment.
- To check coordination among various team at the site and control room.

Responsibility: All Co-ordinators

Process Description:

Schedule of mock drill

Following Mock drill is followed in PHBPL:

- (a) On-site for employees
- (b) On site involving Government Agencies and Mutual Aid partners

Onsite mock drill

- 1.0 Onsite mock drill for Level-I & Level-II scenario in the station made available to all employees (Attached as Annexure- IV)
- 2.0 All coordinators and team members perform their roles and responsibility as per ERDMP.
- 3.0 Observer(s) nominated to observe performance of various teams & equipment.
- 4.0 All employees present at the time of drill shall assemble at assembly point. During de-briefing session following points to be covered
 - Performance of fire fighting system and equipment
 - Response of various teams
 - Head counting

(a) Onsite mock drill involving Government Agencies and Mutual Aid partners

- 1.0 Preparatory activities like informing in writing to various Governments agencies about the date, time and venue of the mock drill.
- 2.0 On the day of mock drill, a meeting is called to describe about the scenario of the mock drill and depending upon the size and activities of the installation, number of observers are identified and check list to be provided to all observers for documentation of activities.
- 3.0 After the mock drill is over, debriefing session is organized, where all the observers put up their findings.
- 4.0 Suitable corrective actions are taken to liquidate the observations.
- 5.0 A report including some photographs is prepared and distributed to participant at a later date. (Format: Format No. F/HSE/01 is referred for compilation of report).

**INDIAN OIL CORPORATION LIMITED
PARADIP-HALDIA-BARAUNI PIPELINE
MOCK FIRE DRILL REPORT**

STATION-

MONTH-

DATE-

1	Type of drill and location	
2	Time of blowing of fire siren	
3	Time of initial attack on fire	
4	No. of extinguishers operated and type (specify the S.No. of extinguishers)	
5	Number of hydrants operated	
6	Duration of operation of fire fighting pumping units	
7	Number of hoses used	
8	Other fire and safety equipment/systems used	
9	Performance of equipment used	
10	Response of the participants	
11	Name and remarks of the observer	
12	Corrective action taken, if any	
13	Name and designation of persons attending the drill	
14	Any specific topic discussed after the drill	
15	Head Count	

Counter signed by HOD/SIC

Sign. of HSE Coordinator

Details of Mutual- Aid System

MUTUAL AID PARTNERS					
Head of Fire & Safety Department					
Organization	PDR	PPL	PHBPL	IFFCO	PPT
Name & Designation	Shri Bhale Ram Malik, CGM (HSE)	Shri. Nihar Kanti Rout, DGM (F&S)	Shri A R Gokhale, CM (HSE)	Shri J P Srivastava, JGM (E&S)	Shri A. Jayasimha Chief Mechanical Engr.
Mobile	919537033433	9937297620	9650100901	7894445850	9438578887
P & T	06722-255104	06722-259600, Ext-2444	06722-226108 9238107126	06722-224032	06722-222034/ 222350
E- mail	phukanIn@indianoil.in	nkrount@adventz.com	gokhaleash@indianoil.in	jpsrivastava@iffco.in	cme@paradipport.gov.in
Alternate					
Name & Designation	Shri B K Panda, DGM (F&S)	Shri S K Rout, Dy. Mgr (F&S)	Shri Vivek Paliwal, AM (HSE)	Shri S K Kamble, M (F&S)	Shri Dhyan Singh DC (Fire) CISF
Mobile	9437492701	9937003308	9981112454	9937238353	9937317555
P & T	06722-255501/252044	06722-259600, Ext-2444	06722-226150 9238107126	06722-224676	06722223015/222425
E-mail	pandabk@indianoil.in	sachitra.rout@adventz.com	paliwalv@indianoil.in	sureshkashinathkamble@iffco.in	
Fire Control Room	06722-255555/252111 06722-255516/255600	9438880002 06722-229600, Ext-2444	9238140562 06722-226142	06722-224600 101/4600	06722-222299/ 221188/ 220702



PARADIP PORT TRUST



IndianOil
PDR & PIPELINES



PARADIP PHOSPHATES LTD.



IFFCO

**MEMORANDUM OF UNDERSTANDING
AMONG
NEIGHBOURING INDUSTRIES
AT
PARADIP
FOR
MUTUAL AID SCHEME
(MAS)**

[Handwritten signatures of representatives from the four organizations]



ଓଡ଼ିଶା ओडिशा ODISHA

H 291508

MEMORANDUM OF UNDERSTANDING FOR MUTUAL AID SCHEME

This present Memorandum of Understanding is made at Paradip Dist - Jagatsinghpur-754141 on this 17th day of April 2018 between the following, the aforesaid being hereafter referred to as "MOU" for a period of three (3) years-

(i) Paradip Refinery of Indian Oil Corporation Limited, PO: Jhimani, Dist: Jagatsinghpur, Pin Code: 754141, Odisha, hereinafter called the "Refinery" of the first part.

And

(ii) Paradip Phosphate Limited (PPL), PO: PPL town ship, Dist: Jagatsinghpur, Pin Code: 754145, Odisha, hereinafter called the "PPL" of the second part.

And

(iii) Pipelines Division of Indian Oil Corporation Limited, PO: Jhimani, Dist: Jagatsinghpur, Pin Code, 754141, Odisha, hereinafter called the "Pipelines" of the third part.

And

(iv) Indian Farmers Fertiliser Cooperative Limited (IFFCO), PO: Paradip, Dist: Jagatsinghpur, Pin Code: 754141, Odisha, hereinafter called the "IFFCO" of the fourth part.

And

(v) Paradip Port Trust, Paradip, Post : Paradip, District: Jagatsinghpur, Odisha-754142, hereinafter will call as "PPT" of the Fifth Part.

Whereas all the above parties, the "Refinery" of the first part, the "PPL" of the second part, the "Pipelines" of the third part, "IFFCO" of the fourth part and "PPT" of the fifth part, hereinafter collectively referred as "Member Units" and individually each as "Member Unit" have agreed to have a voluntary Memorandum of Understanding for Mutual Aid hereinafter called the "Mutual Aid scheme (MAS)" for fighting the outbreak of Fire & helping in Major industrial accidents in their respective establishments and with the view to prevent devastation causing damage to life and property.

Now this indenture WITNESSETH that member units of "scheme" the "Refinery" of the first part, the "PPL" of the second part, the "Pipelines" of the third part, "IFFCO" of the fourth part and "PPT" of the fifth part, hereto agree as follows

PREAMBLE

- a. WHEREAS the member units desire to provide mutual assistance to each other for the purpose of ensuring that any possible hazards at their respective manufacturing sites are dealt with effectively.
- b. AND WHEREAS the Parties hereby agree to abide by the Mutual Aid Scheme ("MAS") which has been formulated jointly by them for governing and regulating their relationship upon occurrence of any major and serious fire or any other emergency or eventuality in their respective Factory premises (**Schedule-1**).
- c. AND WHEREAS the member units hereto have arrived at consensus and desire to put the same in writing containing the terms and conditions, appearing herein below:

NOW THEREFORE THIS AGREEMENT WITNESSES: -

1.0 SCHEME & SCOPE.

- 1.1 The member units hereby agree to become Members to the MAS and to be bound by and perform ALL the obligations and other terms and conditions of the MAS.
- 1.2 The member units herein agree to co-opt more members/other industrial units in Paradip Area, subject to the terms and conditions agreed upon between the Parties in writing.

2.0 PERIOD OF AGREEMENT:

- 2.1 This Agreement shall be effective from the date it is signed and shall remain in operation for three (03) years.
- 2.2 On expiry of the term of this Agreement, it may be renewed/extended by the member units on the conditions as may be mutually agreed to by the member units herein, in writing.

3.0 TERMINATION

- This Agreement shall stand terminated -
- 3.1 Automatically, on the expiry of its period of three (03) years, unless it is extended/ renewed further in writing by the member units.



3.2 If any of the member units make default in rendering the necessary services to the other Party, or breach of any of the terms of this Agreement.

3.3 By giving notice of at least 30 days in writing to the Secretary.

4.0 AMENDMENTS

4.1 Any change, amendment, supplement or modification or addition to this shall be effective only if the same is in writing and signed by all the Parties.

In witness whereof the parties to have affixed their signature with seal on the day herein above written:

Signed, Sealed and Delivered by the member units

Paradip Refinery

Indian Oil Corporation Limited

1. Sign 

Name: L. N. PHUKAN

एल.एन.फुकन / L. N. Phukan,
मुख्य महाप्रबंधक (एच.एस.ई.)
Chief General Manager (HSE)
भारतीय रिफाइनरी (इंडियन ऑइल)
Paradip Refinery (Indian Oil)
Paradip - 754 141 (Orissa)

Pipelines Division

Indian Oil Corporation Limited

3. Sign 

Name: N. SENTHIL KUMAR

N. S. Kumar
मुख्य महाप्रबंधक
Chief General Manager
आई.ओ.सी. एल., एच.एस.ई.एल., एच.एस.ई.एल., एच.एस.ई.एल.
IOCL, SERPL, Paradip

Paradip Port Trust

Paradip Port Trust

5. Sign 
एन. वैयापुरी / N. Valyapuri
अध्यक्ष / Dy. Chairman
पारादीप पत्तन न्यास
PARADIP PORT TRUST

Name :

Paradip Phosphates Ltd.

2. Sign 

Name: Nihar Kanti Rout.

MR. NIHAR KANTI ROUT
Dy. GM & Chief Safety Officer
Paradeep Phosphates Ltd.
PPL Township, Paradeep-754145

IFFCO

4. Sign 

Name: J. P. SRIVASTAVA

J. P. SRIVASTAVA
Jt. General Manager (E & S)
IFFCO Limited, Paradeep Unit
Village-Musadia, P.O.-Paradeep
Dist.- Jagatsinghpur, Odisha-754142




Paradip Refinery
Indian Oil Corporation Limited

Paradip Phosphates Ltd.

WITNESSES

WITNESSES

1. Sign 

2. Sign 

Name: B. K. PANDA

Name: Sachin Kumar


बी. के. पंडा / B. K. Panda
उप महाप्रबंधक (अग्नि एवं सुरक्षा)
Dy General Manager (Fire & Safety)
पारादीप रिफाइनरी (इंडियन ऑयल)
Paradip Refinery (Indian Oil)
पारादीप / Paradip - 754141 (Odisha)

Pipelines Division
Indian Oil Corporation Limited

IFFCO

WITNESSES

WITNESSES

Sign 
Name: A. R. Golchale

Sign 
Name: S. K. KAMBLE
MANAGER (F&S)

आर गोल्चले
Golchale
अग्नि सुरक्षा
(अग्नि सुरक्षा)
पारादीप रिफाइनरी (इंडियन ऑयल)
Paradip Refinery (Indian Oil)
पारादीप / Paradip

Paradip Port Trust

Paradip Port Trust

WITNESSES

Sign 
Name: (R.V.K. NAIR)
DY. COMMANDANT/FIRE
CISF UNIT, PPT, PARADIP



SCHEDULE -1

[MUTUAL AID SCHEME along with ANNEXURE A]

MUTUAL AID SCHEME

This Mutual Aid Scheme ("MAS") is made on this 17th day of April, 2017.

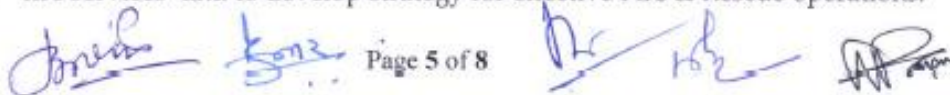
PREAMBLE

- a. WHEREAS the Member units herein have huge industrial complexes, employ large number of employees and are engaged in the manufacturing operations which may be prone to causing Fire and Safety hazards.
- b. AND WHEREAS the Member units intend to ensure avoidance of any possible hazards at their manufacturing sites and have created their own Fire Stations, Fire fighting equipments as also Personnel / Specialists in Fire Fighting / Prevention etc.
- c. AND WHEREAS the Member units considered it necessary and expedient that a Mutual Aid Scheme is formulated between them to govern and regulate their relationship upon occurrence of any major and serious fire or any other emergency or eventuality in their respective Factory premises.
- d. AND WHEREAS the Member units hereto have arrived at consensus and desire to form MAS for the provision of certain mutual aid services (as more particularly described below).
- e. AND WHEREAS the industries wishing to join MAS may do so in future by executing an Agreement between them agreeing to be bound by and comply with the terms and conditions enlisted herein.

Now therefore this Agreement witnesseth as under: -

1.0 SCHEME & SCOPE:

- 1.1 In the event where a major fire/emergency/eventuality occurs at any Party's Manufacturing Site and it becomes essential for that Party to take aid from a neighboring organization for the fire fighting services/resources due to insufficiency of its own resources, the Member units hereto agree that in such cases of fire/emergency, mutual assistance should be rendered by them to each other. For the said purpose, MAS has been formulated and agreed to by the Member units herein for their respective Factory Premises at their addresses.
- 1.2 MAS will also include the following functions:
 - a. Rendering joint assistance to Member unit at major fires, explosion, Toxic gas release and oil spill that may be too large for the affected unit to handle efficiently.
 - b. Exchange of Technical information amongst the participant Member unit's 'fire services' and to develop strategy for effective Fire & Rescue operations.

 Page 5 of 8

2.0 GOVERNANCE:

- 2.1 The duties under MAS shall be carried out by the 'Secretary' who shall be mutually appointed by the Member units in writing for a definite period from time to time.
- 2.2 The Member units shall ensure that the Secretary, MAS should be having relevant educational background and sufficient experience.

3.0 INDIVIDUAL MEMBERS 'FIRE FIGHTING REQUIREMENT':

- 3.1 The fire officers of each Party shall mutually establish the call and turn out procedure.
- 3.2 Each Party shall investigate the cause of fire or explosion and the findings shall be exchanged for the mutual benefit to prevent recurrence.
- 3.3 Fire officers of each Party shall evolve an effective liaison and communication system for prompt, reliable and effective emergency communication. UHF radio sets between the fire station control rooms (under District Disaster Management) is to be maintained

4.0 LIST OF EQUIPMENT:

- 4.1 Each Party shall exchange full details of information regarding various fire fighting appliances available (Annexure-A), so that if necessary, suitable adopters can be made for hooking up the equipment.

5.0 COMMAND AND CONTROL

- 5.1 The Fire Officer of the Party, in whose premises the fire/emergency has occurred, shall be the over all In-charge of the situation and of the assisting fire fighting units.
- 5.2 The Party summoning assistance shall ensure complete personnel protection against health hazard and all other eventualities.
- 5.3 In case of an emergency, the industry in distress should contact on:

1. Paradip Refinery (PDR), IOCL
(Fire control room : Tel No. 06/22-255555/ 252111)
2. Paradip Phosphate Limited (PPL), Paradip
(Fire control room Tel No-06722-229201 , Mob No-9438880002)
3. Pipelines Division, IOCL
(Fire control room (PHBPL); Tel No-9238140562 Mob No-9238340562)
4. IFFCO, Paradip
(Fire control room; Tel No--06722-224600 Mob. No-9937238353)
5. Paradip Port Trust (PPT)
(Fire control room; Tel No--06722-222299/221188 Mob No-9937100468)

Note: The helping member before taking the turn out should cross -check the call with the caller member.

Note: The helping member before taking the turn out should cross -check the call with the caller member.

6.0 CHARGE FOR FIRE FIGHTING SERVICES

- 6.1 All attempts shall be made to replenish the same type of material consumed during fire incident to the assisting Party. On written demand from the assisting Party regarding replenishment of material consumed in any fire, hazard or any incident for which assistance from the Party is sought, the caller Party shall replenish the same to the assisting Party within one month.
- 6.2 No charge shall be recovered against the manpower deployed and fuel used for fire tender deployed for the emergency.

7.0 DAMAGE / INJURY / LOSS OF EQUIPMENT AND LIFE OF ANY PERSON:

- 7.1 During all emergencies (where aid of other participating Party to this Agreement is sought) it will be the responsibility of the respective Party facing the emergency to bear all costs, damage or loss of any fire appliance and equipment damaged either during fire fighting or while responding to or returning from the incident.

Any compensation required to be paid in the event of death / permanent disability/any injury to the person/ personnel or his/their family member (s), / legal heirs as applicable, in terms of the rules of the assisting member unit, such compensation shall be paid by the member unit where he/they is/are employed.

8.0 PRACTICE OF JOINT EMERGENCY EXERCISE / DRILLS

- 8.1 The Member units shall practice Mutual Aid drills / exercise once in a year and place of such drills exercise shall be in one of the Party's premises which shall be rotated every year between the Member units to make the employees of the fire services of the Member units familiar with topography and action expected of them during actual operation.
- 8.2 It will be the responsibility of the Fire officers of the Member units to train their own personnel in Fire fighting.

In witness whereof the member units to have affix their signatures with seal on the day herein above written



ANNEXURE -A

LIST OF FIRE FIGHTING FACILITIES CAN BE SPARED BY MEMBER UNITS

Sl	Item/ Equipment	PDR, IOCL	PPL	PIPELINES	IFFCO	PPT
1	Foam Tenders	01	01	01	01	01
2	Portable fire pumps	01	01	01	01	01
3	Ambulance	01	Nil	Nil	Nil	--
4	Quantity of AFFF in Litres	1000	1000	1000	1000	1000
5	Quantity of DCP	500 KG	100 KG	100 KG	Nil	500 KG
6	B.A. Sets	10	2	01	02	05
7	Gas Masks	05	10	Nil	Nil	05
8	Portable LEL/ Toxic Gas detectors	02 nos.	1no	02 nos.	01	02
9	Fire Proximity Suits	01	1	01	01	01
10	Manpower	06	04	06	03	06
11	Chlorine Leakage Kits	01	01	Nil	01	--
12	Chemical Handling Suits	02	02	Nil	02	--
13	Contact Nos. Fire control room	06722-255555/ 252111	06722-229201 9438880002	9238140562	101/4600	9937100468
14	P&T:	06722-255516/ 255600	06722- 259600, Ext- 101/2444	9238140562	06722-224600	06722-222299/ 221188/ 220702
	Alternate	-	-	9238340562	9937238353	9937100468
15	Contact Nos. HOD of Fire & Safety Department					
	Name	Shri L. N. Phukan CGM(HSE)	Shri Nihar Kanti Rout DGM(F&S)	Shri A. R. Gokhale, CM(H,S&E)	Shri J.P.Srivastava JGM (E&S)	Shri A. Jayasimha Chief Mechanical Engr.
	Mobile	9435014675	9937297620	9650100901	7894445850	9438578887
	P&T	06722-255104	06722-259600, Ext-2285	06722-226108 9238107126	06722-224032	06722-222034/ 222350
	E-mail	phukanln@indianoil.in	nkrou@adventz.com	gokhaleash@indianoil.in	jpsrivastava@iffco.in	cme@paradipport.gov.in
16	Alternate	Shri B.K. Panda, DGM(FS)	Shri S. K. Rout Dy. Mgr (F&S)	Sh. Vivek Paliwal O(H,S&E)	Sh. S. K. Kamble Manager (F&S)	Shri R.V.K. Nair DC (Fire) CISF
	Mobile	9437492701	9937003308	9981112454	9937238353	9937317555/901 3534529
	P&T	06722-255501/ 252044	06722-259600 Ext-2415	06722-226108 9238107126	06722224676	06722223015/22 2425
	E-mail	pandabk@indianoil.in	sachitra.rout@adventz.com	paliwalv@indianoil.in	sureshkashinathkamble@iffco.in	rvknairfire@gmail.com



ANNEXURE-II**Details of Telephone Numbers of Key Persons of the Factory and Local Administrations and Statutory Authorities****STATION:-PARADIP, STD CODE-06722****IMPORTANT TELEPHONE NUMBERS**

S.No	Name	Designation	Office	Residence	Mobile
1.	Ajit Thakur	Chief General Manager	06722-226101/103	-	9971744599
2.	Ramesh Kumar	General Manager	06722-226106		9430056199
3.	K Navin Sankaran	DGM (O)	06722-226102	-	7827652020
4.	Debabrata Mohanty	DGM(MN)	06722-226109	-	9654177411
5.	B Shreekanth	DGM (T)	06722-226105		9490958020
6.	Aashish Gokhale	CM (HSE)	06722-226108	-	9650100901
7.	Angshuman Roy	CMNM	06722-226110	-	9435009951
8.	Bibekananda Nayak	CFM	06722-226107		9439955804

Statutory Authorities

S. No	Designation	Telephone
1.	District Magistrate, Jagatsinghpur	+91-6724-220379 +91-9439910025(M)
2.	Additional District Magistrate, Paradip	+91-6722-222237 +91-9438444918 (M)
3.	Superintendent of Police, Jagatsinghpur	+91-6724-220115 +91 – 9439440000(M)
4.	Additional Superintendent of Police, Paradip	+91-6722-222997 +91- 9439049600(M)
5.	Director of Factories & Boilers, Bhubaneswar	0674-2396070 / 23962228
6.	Asst. Director of Factories & Boilers, Cuttack Zone-I	0671-2334296
7.	Factories Inspector, Bhubaneswar	0674-2402228
8.	Chief Controller of Explosive, Nagpur	0712-2510248
9.	Dy. Chief Controller Explosive, Bhubaneswar	8895430309
10.	Chief Medical Officer, Jagatsinghpur District	06724-220064, 9439991868
11.	District Emergency Control Room	+06724-220368, 1077 (Toll free)

Civil Authorities

S. No	Designation	Telephone
1	Additional District Magistrate, Paradip	06722- 222237 (O)/222003®
2	Police Station, Paradip	100 / 06722-222027 / 222057
3	Police PPL Phandi	06722-229583
4	Railway Station Paradip	06722-229434 / 2642395
5	Port Trust Fire Brigade, Paradip	101/ 222385

6	Coast Guard Commandant, Paradip	06722-222712 / 220174
7	Doordarshan, Paradip	06722-222905
8	Fire Brigade- CISF	06722-222385
9	Collector & District Magistrate, Jagatsinghpur	06724-220379 (O) / 220199 (R)
10	SP, Police Jagatsinghpur	06724-220115 (O) / 220015 (R)
11	District Emergency Control Room	06724- 220368, 1077(Toll Free)
12	Odisha Fire Services, Kujang	06722-236246
13	OFS, Tirtol	06722-250445
14	Superintendent Engineer, CESU, Paradipgarh	9238130050
15	Executive Engineer, CESU, Paradipgarh	9437202188

Medical Services

S. No	Designation	Telephone
1	Ambulance	102
2	Port Hospital Paradip	102, 06722-222041
4	State Govt Hospital, Paradip	06722-222399 / 223123
5	Dr. A.K.Lenka	06722-222513
6	Dr. R.K.Nayak	06722-222587
7	URMI Medicine Store	06722-222281
8	JAYANT Medical Store	06722-222513
9	District Hospital, Jagatsinghpur	06724-221435
10	District Medical Control Room, Jagatsinghpur	06724-221119
11	Kujanga CHC	06722-236744
12	Manijanga CHC	06722-251446
13	Raghunathpur CHC	06724-267906
14	SCB Medical college, Cuttack	0671-2614122 / 2614144
15	Kalinga Hospital, Bhubaneswar	0674-2300570 / 2300574

Nearby Industries

S. No	Designation	Telephone
1	Chairman Paradip Port Trust, Paradip	06722 -222046 / 222127
2	IFFCO, Paradip	06722 - 222835 / 220890
3	IOCL, Mkt. Terminal, Paradip	06722 -222473 / 222848
4	BPCL Terminal, Paradip	06722 -223471 / 221923
5	HPCL Terminal, Paradip	06722 -222641 / 223278
6	Fire Services Paradip Phosphates Ltd, Paradip	06722-229600- Extn. 2333/ 2444
7	Disaster Management Control Room, PPL	06722-229600 – Extn. 2415
8	Cargil India Pvt. Ltd, Paradip	06722-222827 / 222812
9	SKOL Breweries, Paradip	06722-222514 / 222613
10.	ESSAR Steel Security	06722-216013

Fire Brigade

S. No	Designation	Telephone
1	Fire Officer, Jagatsinghpur	+91-6724-220099
2	Fire Officer, Tirtol	+91-6724250445

3	Fire Officer. Kujanga	+91-6724236246
4	Dist. Fire Officer. Cuttack	+91-671-2306101

IOCL VK Hospital

S. No	Designation	MOBILE/BSNL
1	EMERGENCY WARD	211627
2	AMBULANCE (Basic Life Support)- General	9938642247
3	AMBULANCE (Advanced Life Support)- Critical	8599009075
4	APOLLO PHARMACY	253190

MATERIAL SAFETY DATA SHEET**CRUDE OIL**

CHEMICAL IDENTITY

Chemical Name	Petroleum Crude Oil	Chemical Classification	Hydrocarbon Mixture		
Synonyms	Crude Oil	Trade Name	Crude Oil		
Formula	Mixture of Hydrocarbon	C.A.S. NO.		UN NO.	1267
Regulated Identification	Shipping Name	Crude Oil			
	Codes/Label	Flammable, Class 3			
	Hazardous waste I.D. No.	17			
	Hazchem Code	3 W E			
HAZARDOUS INGREDIENTS	C.A.S. NO.	HAZARDOUS INGREDIENTS	C.A.S. NO.		
1. Mixture of Hydrocarbons					

PHYSICAL AND CHEMICAL DATA

Boiling Point/ Range °C	150 – 300	Physical State	Liquid at 15°C and 1 atm	Appearance	Dark Brown/ Black
Melting/ Freezing Point °C	- 20 to 60	Vapour pressure @ 35 °C, mm Hg	> 3 mm at 20 °C	Odour	Acrid/ tarry
Vapour Density (Air = 1)	3 to 5	Solubility in water @ 30 °C	0.001 mg/ 100 ml	Solubility in others	Soluble in Organic

					Solvents, Alcohol
Specific Gravity (Water = 1)	0.8 – 0.9 at 15 °C	pH	Not pertinent		

FIRE AND EXPLOSION HAZARD DATA

Flammability	Moderate	LEL (%V)		Flash Point (OC) °C	10-20 (Typical)
TDG Flammability	Flammability	UEL (%V)		Flash Point, (CC) °C	
Auto ignition Temperature °C		> 400 (Typical)			
Explosion Sensitivity to Impact					
Explosion Sensitivity to Static Electricity					
Hazardous Combustion products		Toxic gases, vapours			
Hazardous Polymerization		Does not occur			
Combustible Liquid	Yes	Explosive Material	No	Corrosive Material	No
Flammable Material	Yes	Oxidiser	No	Others	
Pyrophoric Material	No	Organic Peroxide	No		

REACTIVITY DATA

Chemical Stability	Stable
Incompatibility with other material	Oxidising agent
Reactivity	No reaction with common materials
Hazardous Reaction Products	

HEALTH HAZARD DATA

Routes of Entry	Inhalation, Skin, Contact
Effects of Exposure/ Inhalation	Causes dizziness, headache.
Symptoms	
Ingestion	Causes nausea and vomiting
Contact	Contact with eye and skin causes irritation.

Emergency Treatment	Seek medical aid immediately
Inhalation	Move victim out of spill area to fresh air. Call for medical assistance but start first aid at once. Give water to conscious victim to drink.
Contact	Skin : Remove contaminated clothing. Wipe off as much oil as possible. Wash skin thoroughly with warm water (and soap if available) for at least 15 minutes. Eyes : Flush with plenty of water.

LD ₅₀ (Oral-Rat), mg/kg	Not listed	LD ₅₀ , mg/kg	
Permissible Exposure Limit mg/kg	Not listed	Odor Threshold, ppm	Not listed
TLV (ACGIH) ppm	Not listed	mg/kg	
mg/kg	5 mg/m ³	STEL, ppm	Not listed
		mg/kg	
NFPA Hazard Signals	Health 1	Flammability 3	Reactivity/Stability 0
			Special

PREVENTIVE MEASURES

Personal Protective Equipment	Goggles/ face shields for eyes. Rubber hand gloves and rubber clothing.
Handling and Storage Precautions	Keep away from heat and flame. Prevent entry into water intakes and waterways.

EMERGENCY AND FIRST AID MEASURES

FIRE	Fire Extinguishing Media	Foam, CO ₂ , Dry Chemical Powder
	Special Procedure	Keep the containers cool by spraying water if exposed to fire or heat.
	Unusual Hazards	Violent boil-over is likely in case of prolonged tank fire.
EXPOSURE	First Aid Measures	Move victim out of spill area to fresh air. Call for medical assistance but start first aid at once. Give water to conscious victim to drink.
	Antidotes/ Dosage	
SPILLS	Steps to be taken	Shut off leaks.
	Waste Disposal Method	

ORGANOGRAM FOR LEVEL 1 & LEVEL 2 EMERGENCIES

EMERGENCY RESPONSE TEAMS

Three teams namely Fire Combat Team, Auxiliary Team & Rescue Team have been formed for handling fire emergencies of level 1 & level 2 at all stations. This helps in executing pre-assigned role to each team and considerable reduction in response time.

Accordingly, following are the team constitutions at PHBPL, Paradip. However, employees whose name is not appearing in the below mentioned organogram, shall assemble at "Assembly Point"- North Gate and wait for further instruction.

EMERGENCY ORGANISATION AND RESPONSIBILITIES

(Under Regulation 14 of ERDMP regulation 2010)

Organogram for level 1 & level 2 emergencies

CRISIS CO-ORDINATOR (UNIT) –
CGM(O), SERPL, Paradip

ALTERNATE CRISIS COORDINATOR (UNIT) –
GM (O), PHBPL, PARADIP

CHIEF INCIDENT CONTROLLER –
GM (O), PHBPL, PARADIP

ALTERNATE CHIEF INCIDENT CONTROLLER –
DGM (O), PHBPL, PARADIP

STORAGE TANK RELATED FIRE:

Three teams namely Fire Combat Team, Auxiliary Team & Rescue Team have been formed for handling fire emergencies of level 1 & level 2 at all stations. This helps in executing pre-assigned role to each team and considerable reduction in response time. In general team composition & roles of various teams are as follows.

<u>FIRE COMBAT TEAM</u> (Identification Jacket Colour Red)	<u>AUXILLARY TEAM</u> (Identification Jacket Colour Yellow)	<u>RESCUE TEAM</u> (Identification Jacket Colour Green)
<p style="text-align: center;">CISF(Fire) Wing</p> <p>Assisted by S/shri.</p> <ol style="list-style-type: none"> 1. K Navin Sankaran, DGM(O) – Team Leader 2. Aashish Gokhale, CM(HSE) – Alt. Team Leader 3. T. Ravindra, CIPM 4. Chaitanya K Munipalli, OM 5. Shaon Ghosh, M(T&I) 6. Virendra Bhimwal, AM (Mat) 7. Chandan Behera, AM(E) 8. Mandeep Singh, AM(O&M) 9. Rakesh Kr. Singh, AM(Mat) 10. Danish Naseem, AM(IP) 11. Vivek Paliwal, AM(HSE) 12. Mahesh SVS, SO&ME 13. Mahendra Meena, SO&ME 	<p>S/shri.</p> <ol style="list-style-type: none"> 1. D Mohanty, DGM(MN) – Team Leader 2. Angshuman Roy, CMNM – Alt. Team Leader 3. Shammi K Prasad, MNM 4. Debashish Chakraborty, M 5. Shivam Agnihotri, M(M) 6. Rohitash Garg, M(M) 7. Sauvik K Gohain, AM(TS) 8. Hemanta Das, AM 9. Shivang Chandrakar, AM 10. Rajesh, SO&ME 11. Mayank K Singh, SO&ME 12. Atul Pandey, SO&ME 13. J. K. Parida, EA 14. SM Ali, EA 15. RN Sahoo, EA 16. Rigan Kumar, EA 	<p>S/shri.</p> <ol style="list-style-type: none"> 1. B. Shreekanth, DGM (T) – Team Leader 2. B Nayak, CFM – Alt. Team Leader 3. Subrajeet Choudhury, HRM 4. Mani Bhushan, M(IS) 5. Mainline Deptt. 6. Finance Deptt. 7. HR Deptt.

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14. GJ Shrikanth, SO&ME 15. Ramakrishna Behera, IPE 16. Karandeep Singh, GAE 17. Siddhartha Sahoo, EA	17. Utsav Kumar, EA	
Duties and Responsibilities <ul style="list-style-type: none"> To reach fire/emergency site and start F/F operation & assist CISF (fire) To liaison for F/F To give clearance signal when everything is in normal. 	Duties and Responsibilities <ul style="list-style-type: none"> Start F/F pump, Foam pump and man these locations To assist Fire combat team by supplying all material Stoppage of all ongoing works Evacuation of labours and other personnel Advise security to open emergency gates Directing Mutual Aid Members and outside agencies to fire spot Help Fire combat team in F/F if required Operation of water replenishment system for fire water pond/tank 	Duties and Responsibilities <ul style="list-style-type: none"> Take control of First Aid box and stretchers Set a first aid centre and provide first aid to injured Transport injured to the hospital To remove any unwanted material from fire site Manning of communication system at Site Liaising for vehicle requirement at site

However, any roles assigned to any team can be changed as per specific incident requirement. However, employees whose name not appearing in the above, shall assemble near "Assembly Point" and wait for further instructions.

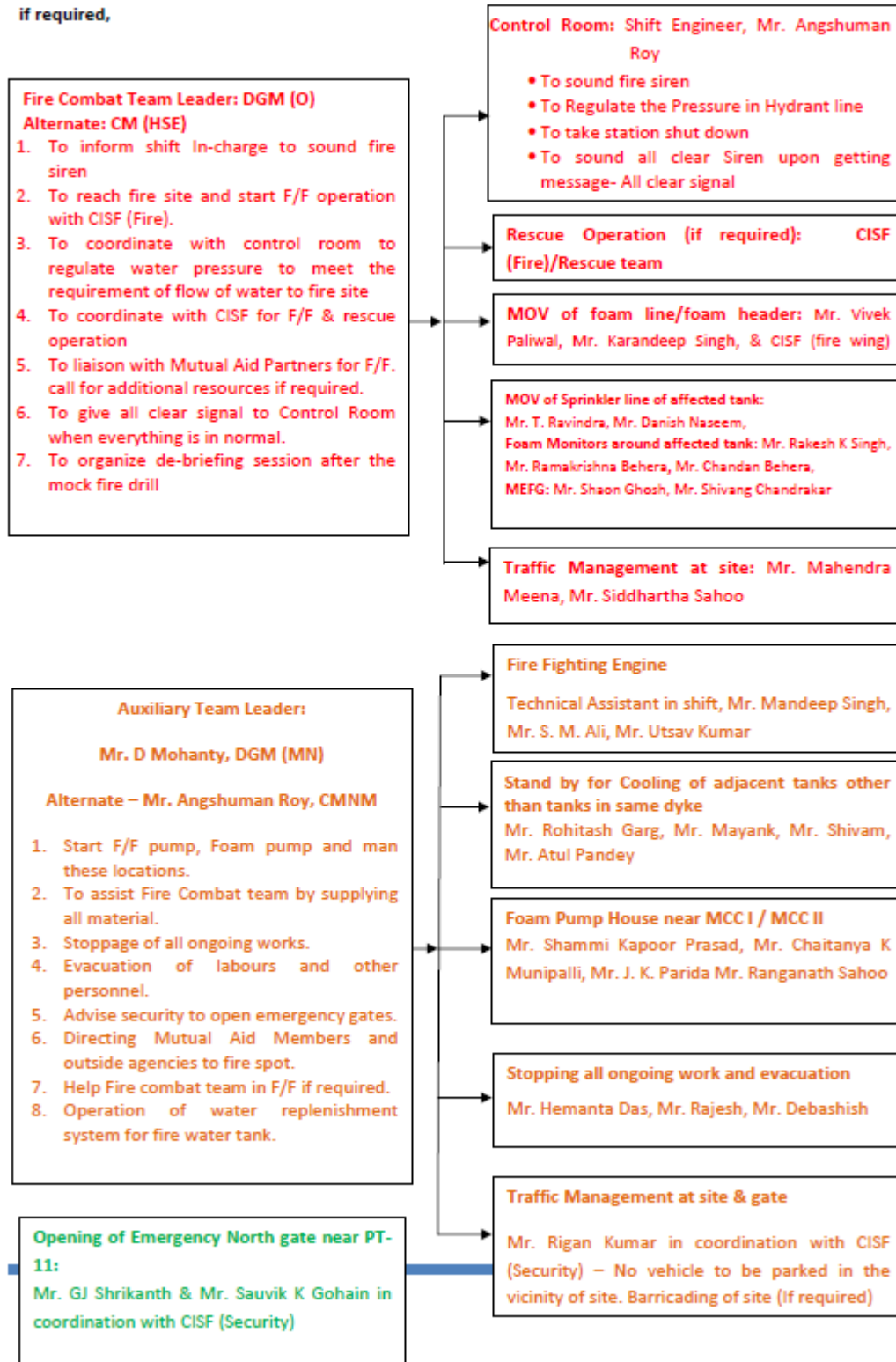
Organogram for Level 1 (Small Fire) and Level 2 (Major Fire Emergency) in the station

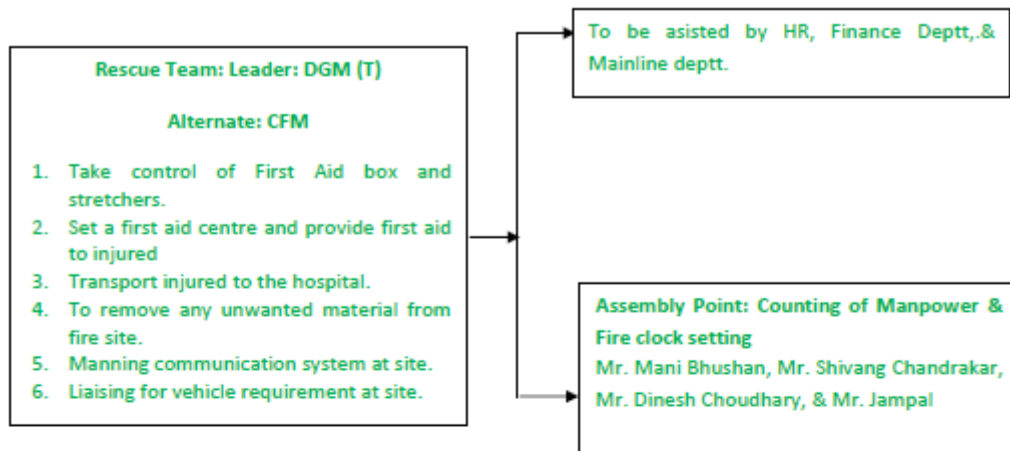
Scenario: Rim seal fire in tanks

Upon activation of Rim Seal (Either through Simulation or automatically) following physical activities will take place immediately

- ❖ Discharge of foam from foam module
- ❖ Fire Siren will sound
- ❖ Fire Fighting Pumping unit will start (4 are kept on auto mode)
- ❖ MOV of water sprinkler system to be opened (manually if required), cooling system of target tank & adjacent tank in the same dyke will start and tanks will be cooled.
- ❖ Foam pump (either near MCC I or MCC II) to be started manually & HOV below foam tank to be opened (kept in manual mode to avoid dry run of the pump since foam tank outlet valve is kept in closed condition) depending upon the target tank.
- ❖ MOV of foam system to be opened manually/will operate on auto and foam will start pouring in rim seal area of targeted tank.

Following members will be positioned at site to observe and operate the facilities in manual mode, if required,





EMERGENCY ORGANISATION AND RESPONSIBILITIES

(Under Regulation 14 of ERDMP regulation 2010)

Organogram for level 1 & level 2 emergencies

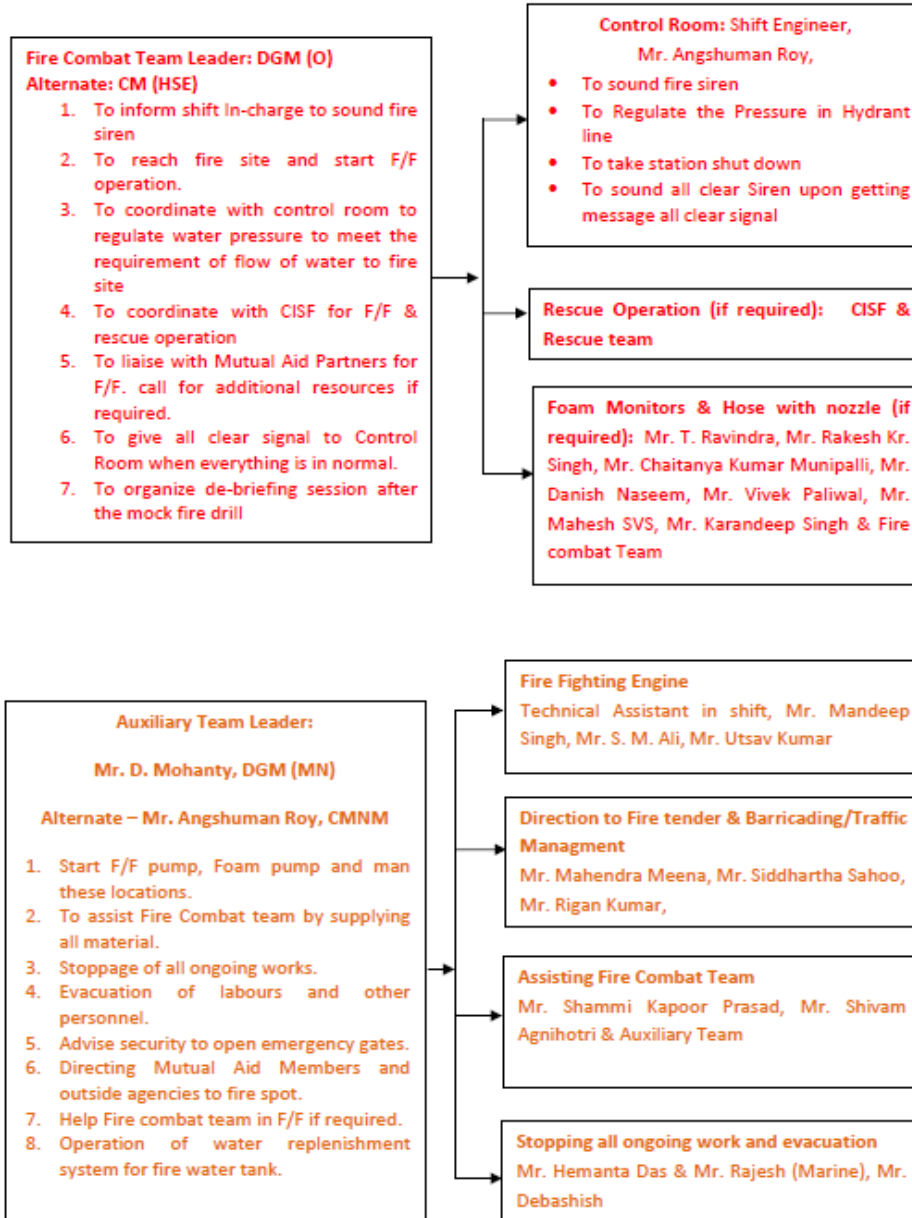
ALL FIRES OTHER THAN STORAGE TANK RELATED FIRE:

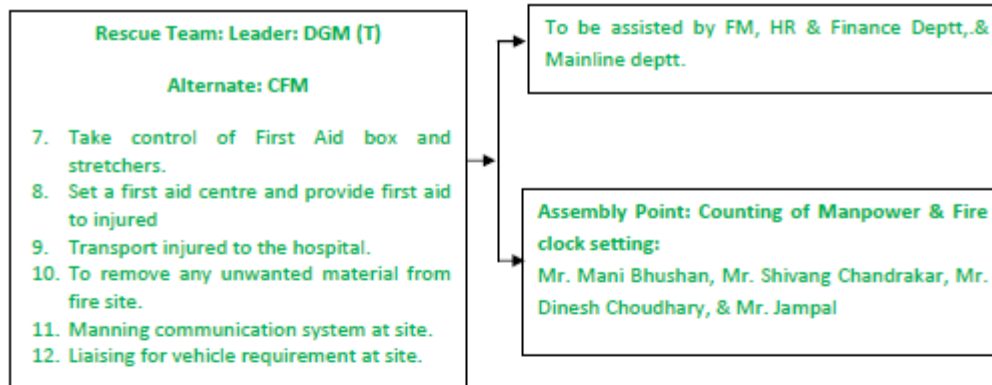
Organogram for Level 1 (Small Fire) and Level 2 (Major Fire Emergency) in the station

Scenario: Fire in COT Area, Scrapper Launching Barrel, MLPU shed, Booster Pump Shed, and Admin Building

- ❖ Upon getting the information of fire/fire alarm, shift-in-charge will inform fire control room to take turnout at location to verify & also one shift personnel will immediately rush to the site.
- ❖ On confirmation of fire or any emergency at site, he will quickly communicate to the control room. Control room personnel will take following action
 - Sound Fire Siren.
 - Start Fire Fighting Pumping units to maintain pressure (4 are kept on auto mode)
 - Inform different officials as per procedure.

Following members will be positioned at site to observe and operate the facilities in manual mode, if required



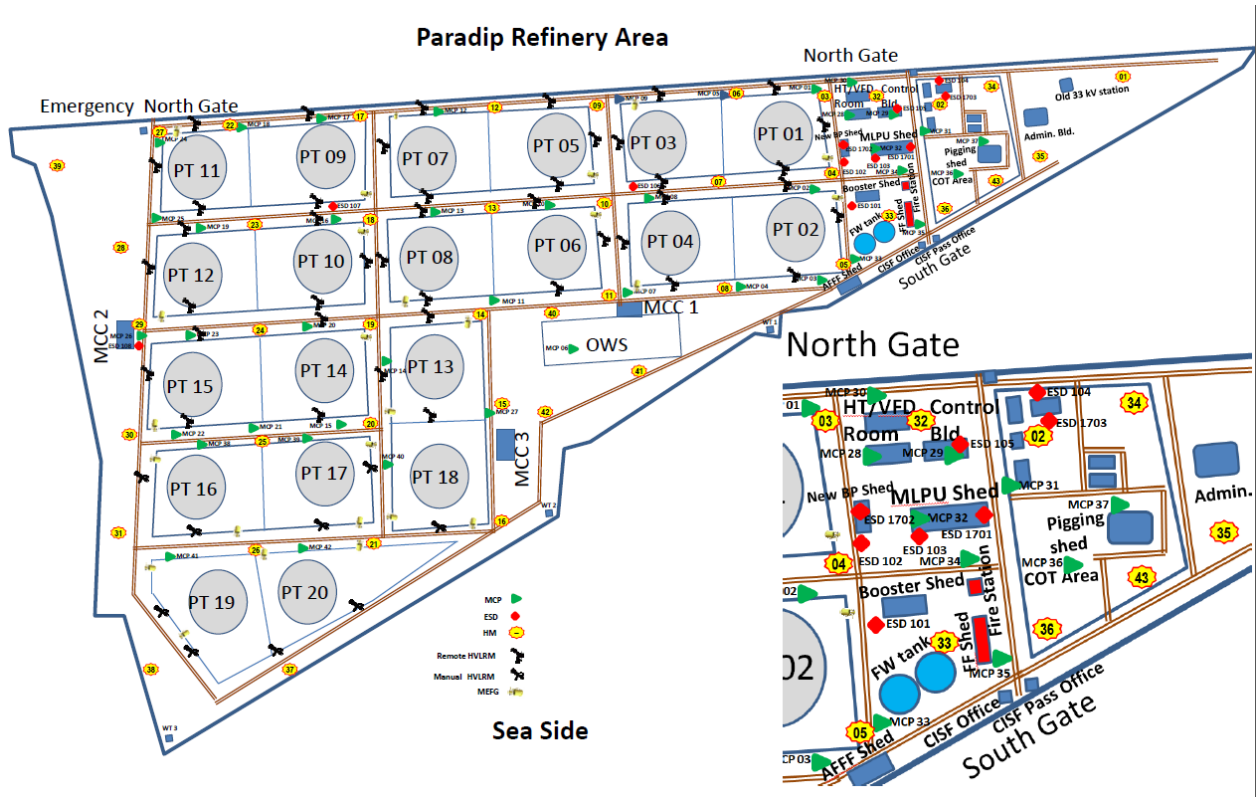


NOTE:

1. These are the indicative activities & responsibilities required to be performed at site in case of Level 1 & Level 2 emergencies which may change according to the site conditions.
2. The firefighting system is maintained in auto mode. In case of any fire in rim seal area, fire fighting system will be activated automatically.
3. All members are requested to visit the site/respective area of responsibility for checking the facilities and get acquainted with the system.
4. After the drill (all clear siren) all members shall assemble near assembly point near North gate and performance of the drill shall be discussed where CGM/GM (O) will be present.
5. All EIC/Site Engineers are requested to inform their Contractors that all contract Labours working inside the tank farm/station to evacuate the site upon hearing the fire siren and assemble at the assembly point.
6. Every employee whose name/designation does not appear in the chart should rush to Assembly point and Senior most employee should visit to the control room to collect one walkie-talkie set, so that all the members at the Assembly point can abreast with the situation and wait for further instruction by Fire Combat team leader/ Rescue Team Leader/ Auxiliary Team Leader for any assistance.

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LOCATION OF EMERGENCY SHUT DOWN AND MANUAL CALL POINTS AT PARADIP



RISK ANALYSIS SCENARIOS & MODELLING

Paradip Station

As per the data given in climate-logical Tables by IMD, the annual mean wind velocity is 4.7 m/s. During January to May and November to December (7 months) the wind velocity generally lies between 2.8 to 6.6 m/s. During the five monsoon months June to October, the average velocity is about 5.0 m/s. Annual mean humidity is 80%.

Following major emergencies (Categorized as level 2 & 3) considered for risk analysis and modeling done through software DNV Phast:

S. No.	FAILURE CASE -LIKELY CONSEQUENCES	Level
	Paradip	
1.	Inlet from 1st SPM leakage/ rupture – Flash Fire/ VCE(Large Leak)	Level 2
2.	Crude Oil Tank leakage/ rupture – Flash Fire/ VCE(Large Leak)	Level 3
3.	Booster Pump suction/discharge leakage/ rupture – Flash Fire/ VCE (Large Leak)	Level 2
4.	Main Line Pump discharge/suction leakage/ rupture– Flash Fire/ VCE (Large Leak)	Level 2

Notes:

- The following wind velocity/ stability class combinations & frequencies are used for Quantified Risk Assessment. The same is in line with the guidelines issued by MoEF for Risk Assessment Calculations for MAH units.
D (Neutral) – 3 m/s F (Very stable) – 1 m/s, Annual mean air temperature is taken as 35 degree centigrade. Annual mean humidity is 80%.
- Effects Due To Incident Radiation Intensity**

Incident radiation – kW/m ²	Type of damage
0.7	Equivalent to Solar Radiation
1.6	No discomfort for long exposure
4.0	Sufficient to cause pain within 20 sec. Blistering of skin (first degree burns are likely)
9.3	Pain threshold reached after 8 sec. Second degree burns after 20 sec. 1% lethality.
12.5	Minimum energy required for piloted ignition of wood, melting plastic tubing etc. 10% lethality.
18.47	50% lethality.
36.56	99% lethality.

3. Damage Due To Overpressures

Peak Overpressure, bar	Damage Type
0.83	Total destruction
0.30	Heavy damage, nearly complete destruction of houses
0.27	Cladding of light industrial building ruptures
0.2	Steel frame buildings distorted and pulled from Foundations
0.16	Lower limit of serious structural damage
0.14	Partial collapse of walls and roofs of houses
0.027	Limited minor structural damage
0.01	Typical pressure of glass breakage

Scenario-1:- Inlet from SPM leakage/ rupture – Flash Fire/ VCE (Large Leak)

Parameters

Temperature	-	35°C
Pressure	-	4 Kg/Cm ²
Mass Flow	-	9000 Kl/hr.
Released Quantity	-	450 KL

Flash Fire Model

Concentration (ppm)	Distance (m)	
	F (1 m/s)	D (3 m/s)
5000	559.46	309.19
10000	278.5	218.37

Vapour Cloud Explosion Model

Maximum distance at which ignition can occur before the gas concentration falls below LEL limit = 550 m (F – 1 m/sec) & 300 m (D – 3 m/sec)

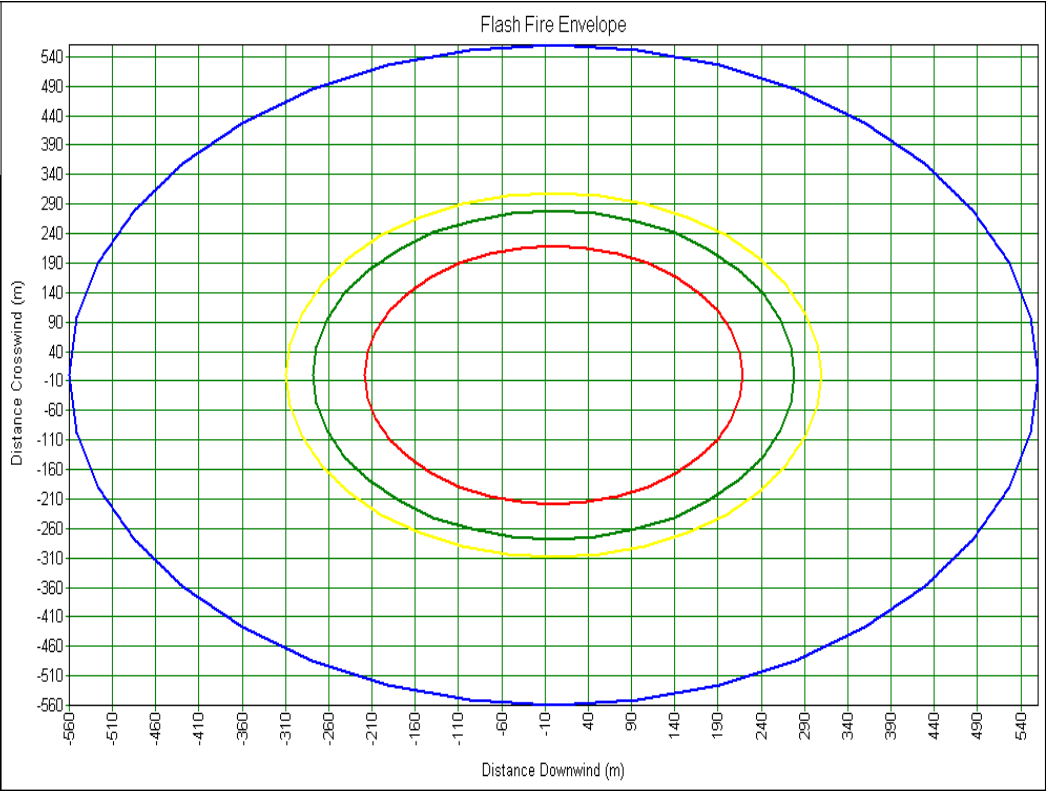
Damage Type, bar	F- 1 m/sec	D – 3 m/sec
	Max (m)	Max (m)
0.02068	692.94	568.30
0.1379	471.43	369.47
0.2068	468.85	353.75

ACCIDENT PROBABILITY

Accident Probability - 5 E-5 per year

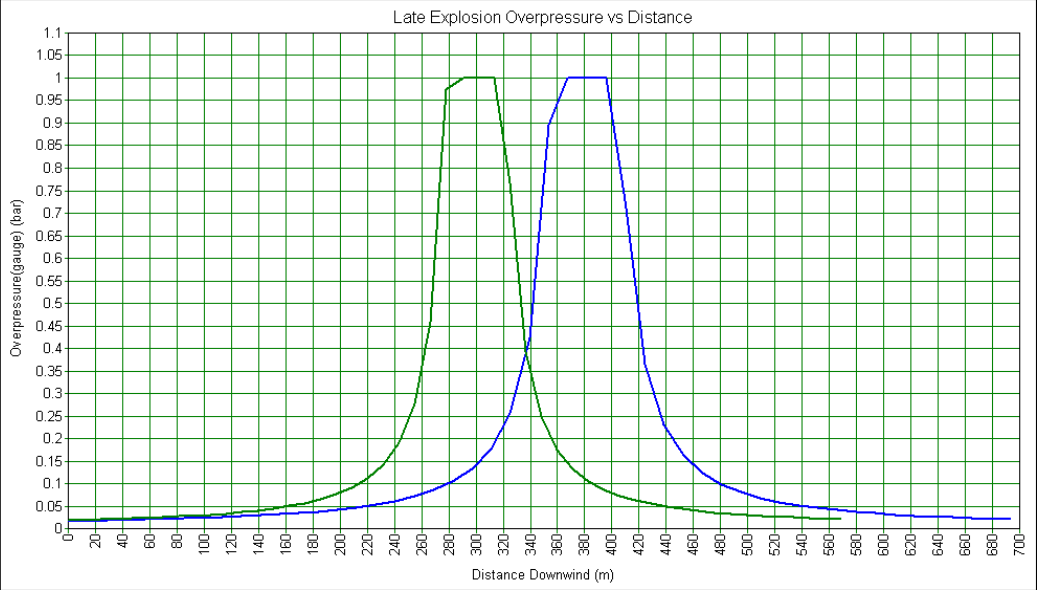
Study Folder: Inlet from 1st SBM leakage
 Audit No: 1579
 Model: Inlet from 1st SBM leakage
 Material: CRUDE OIL
 Weathers

- Category 1/F 5000 ppm
- Category 1/F 1e+004 ppr
- Category 3/D 5000 ppm
- Category 3/D 1e+004 ppr



Study Folder: Inlet from 1st SBM leakage
 Audit No: 1579
 Model: Inlet from 1st SBM leakage
 Material: CRUDE OIL
 Worst Cases @: 0.02068 bar
 Weathers

- Category 1/F
- Category 3/D



Scenario -2:- Crude Oil Tank leakage/ rupture – Flash Fire/ VCE(Large Leak)

Parameters

Temperature	-	35°C
Mass Flow	-	9000 KI/hr.
Released Quantity	-	450 KI

Flash Fire Model

Concentration (ppm)	Distance (m)	
	F (1 m/s)	D (3 m/s)
5000	429.18	161.56
10000	321.83	102.54

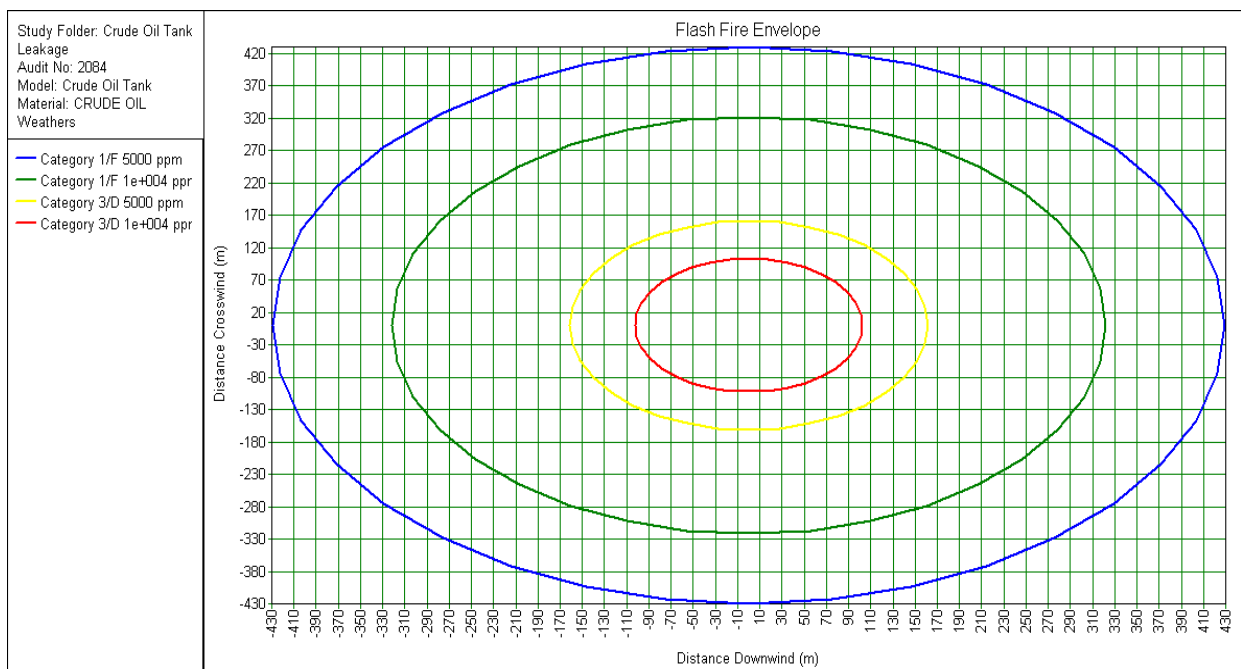
Vapour Cloud Explosion Model

Maximum distance at which ignition can occur before the gas concentration falls below LEL limit = 420 m (F – 1 m/sec) & 160 m (D – 3 m/sec)

Damage Type, bar	F- 1 m/sec	D – 3 m/sec
	Max (m)	Max (m)
0.02068	1156.46	423.56
0.1379	610.70	228.24
0.2068	567.55	212.80

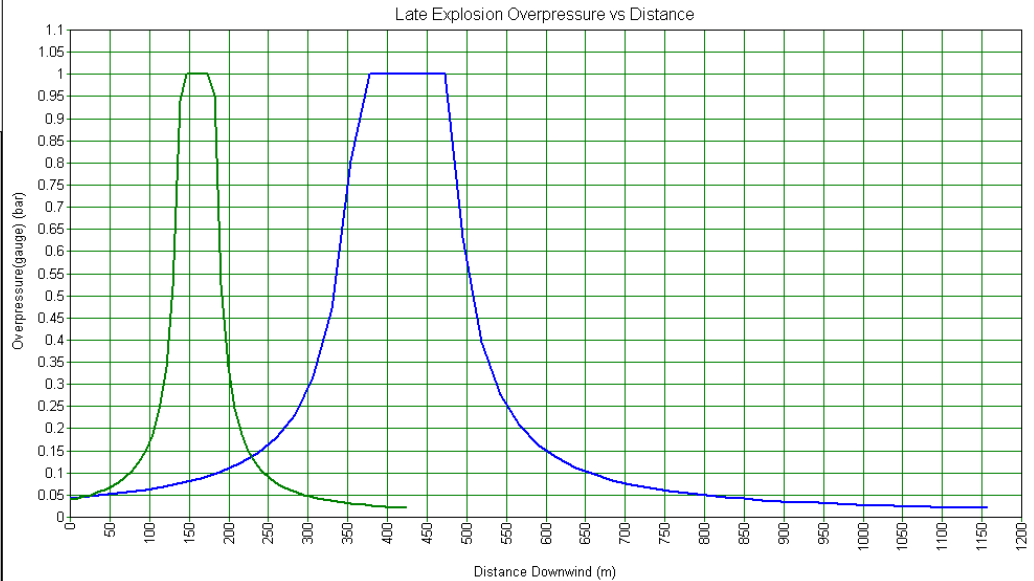
ACCIDENT PROBABILITY

Accident Probability - 2.5 E-5 per year



Study Folder: Crude Oil Tank Leakage
 Audit No: 2084
 Model: Crude Oil Tank
 Material: CRUDE OIL
 Worst Cases @: 0.02068 bar Weathers

— Category 1/F
 — Category 3/D



Scenario -3:- Booster Pump suction leakage/ rupture – Flash Fire/ VCE (Large Leak)

Parameters

- Temperature - 35°C
- Mass Flow - 2400 KI/hr.
- Pump Head - 13.40 M
- Released Quantity - 120 KI

Flash Fire Model

Concentration (ppm)	Distance (m)	
	F (1 m/s)	D (3 m/s)
5000	343.23	140.70
10000	250.00	90.34

Vapour Cloud Explosion Model

Maximum distance at which ignition can occur before the gas concentration falls below LEL limit = 340 m (F – 1 m/sec) & 140 m (D – 3 m/sec)

Damage Type, bar	F- 1 m/sec	D – 3 m/sec
	Max (m)	Max (m)
0.02068	800.32	360.24
0.1379	413.82	197.02
0.2068	386.03	184.12

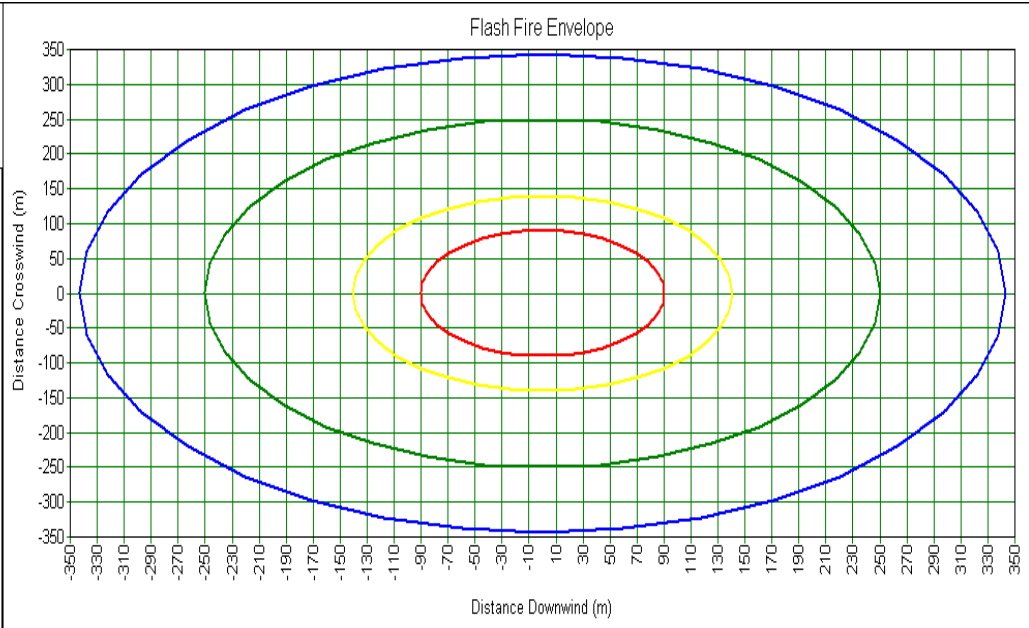
ACCIDENT PROBABILITY

Accident Probability

- 5 E-5 per year

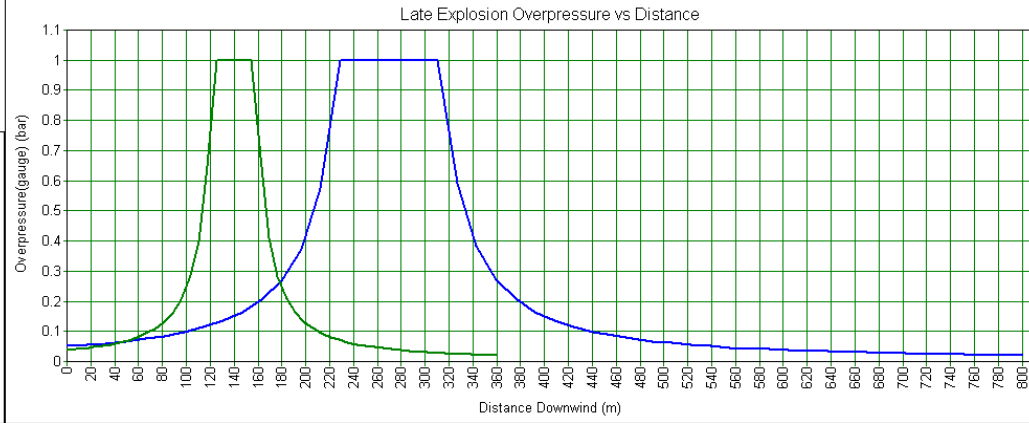
Study Folder: Booster Pump
 Suction
 Audit No: 2950
 Model: Booster Pump
 Material: CRUDE OIL
 Weathers

- Category 1/F 5000 ppm
- Category 1/F 1e+004 ppr
- Category 3/D 5000 ppm
- Category 3/D 1e+004 ppr



Study Folder: Booster Pump
 Suction
 Audit No: 2950
 Model: Booster Pump
 Material: CRUDE OIL
 Worst Cases @: 0.02068 bar
 Weathers

- Category 1/F
- Category 3/D



Scenario -4:-Main Line Pump discharge leakage/ rupture – Flash Fire/ VCE (Large Leak)

Parameters

Temperature	-	35°C
Pressure	-	68.45 Kg/cm ²
Mass Flow	-	2400 Kl/hr.
Released Quantity	-	120 Kl

Flash Fire Model

Concentration (ppm)	Distance (m)	
	F (1 m/s)	D (3 m/s)
5000	664.60	967.20
10000	382.33	443.00

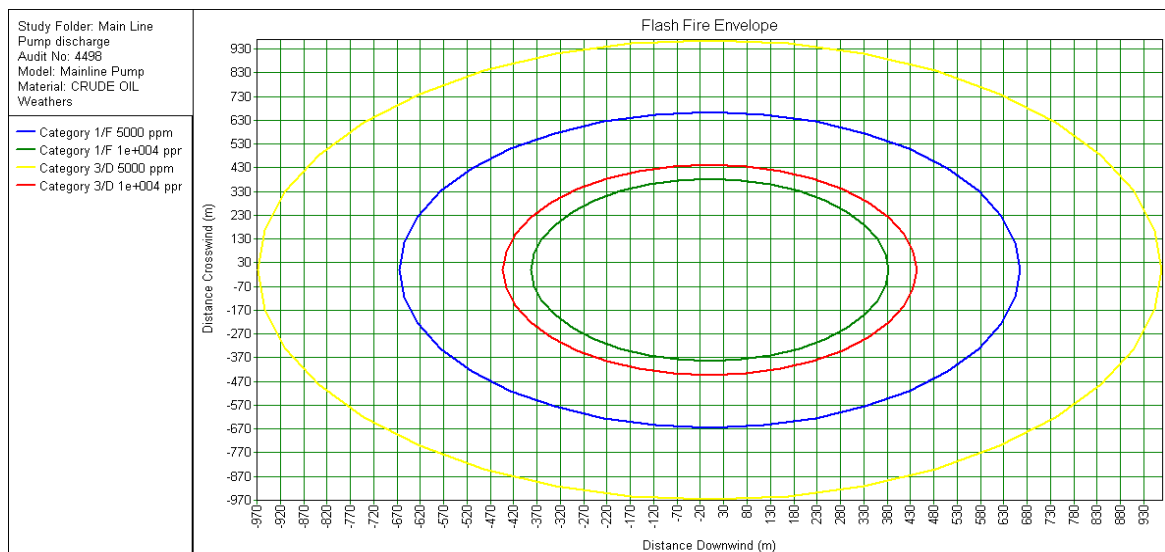
Vapour Cloud Explosion Model

Maximum distance at which ignition can occur before the gas concentration falls below LEL limit = 660 m (F – 1 m/sec) & 960 m (D – 3 m/sec)

Damage Type, bar	F- 1 m/sec	D – 3 m/sec
	Max (m)	Max (m)
0.02068	1169.74	1370.26
0.1379	750.87	1022.62
0.2068	726.1	1008.45

ACCIDENT PROBABILITY

Accident Probability - 1.15 E-4 per year



Study Folder: Main Line
Pump discharge
Audit No: 4498
Model: Mainline Pump
Material: CRUDE OIL
Worst Cases @: 0.02068 bar
Weathers

— Category 1/F
— Category 3/D

